STAPLE VITREOUS CHINA PLUMBING FIXTURES

(FOURTH EDITION)

COMMERCIAL STANDARD CS20–47

[Supersedes CS20–42]

Effective Date for New Production from July 12, 1947

A RECORDED VOLUNTARY STANDARD
OF THE TRADE

UNITED STATES DEPARTMENT OF COMMERCE
W. AVERELL HARRIMAN, SECRETARY

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COMMERCIAL STANDARDS

Commercial Standards are voluntary standards of the trade developed through concerted action of those directly concerned, and issued by the United States Department of Commerce upon written evidence of their acceptability to the trade. They are initiated by written request from a responsible element of business to the Division of Trade Standards of the National Bureau of Standards. The Division of Trade Standards acts as a coordinating and fact-finding agency in ascertaining the desires of all concerned.

The Federal Government exercises no regulatory authority in the enforcement of Commercial Standards. In accepting a Commercial Standard, the producer, distributor, or user says in effect that he considers it a useful standard of practice, and plans to utilize it as far as practicable in his business, reserving the right to depart from the standard so long as no deception results from such departure. When reference to a Commercial Standard is made in contracts, labels, invoices, or advertising literature, however, the provisions of the standard are enforcible through usual legal channels as a part of the sales contract.

Organized in 1927, the Division of Trade Standards has assisted many industries in the development of Commercial Standards for a wide variety of commodities. A list of previously established Commercial Standards appears herein.

COMMERCIAL STANDARD FOR STAPLE VITREOUS CHINA PLUMBING FIXTURES

On September 25, 1929, the Manufacturers' Advisory Committee on Vitreous China Plumbing Fixtures adopted a commercial standard which was subsequently accepted by the industry and issued as Staple Vitreous China Plumbing Fixtures, Commercial Standard CS20–30 (First Revision of Simplified Practice Recommendation R52). In 1936, a revision was adopted and issued as CS20–36. Certain items and tests were added in 1942, and a third edition was similarly adopted and issued as CS20–42.

On December 27, 1946, with the endorsement of the Standing Committee, a revision drafted by the Vitreous China Plumbing Fixtures Association to include certain modifications and two additional items was circulated for written acceptance. The trade has since approved the fourth edition as shown herein for issuance by the United States Department of Commerce.

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STAPLE VITREOUS CHINA PLUMBING FIXTURES

(Fourth Edition)

COMMERCIAL STANDARD CS20–47

CONTENTS

GENERAL REQUIREMENTS

1. The nomenclature, definitions, and grading rules given herein are standard for all vitreous china plumbing fixtures.

2. Dimensions and general practices given herein are standard for staple vitreous china plumbing fixtures as listed herein. The line drawings herein contained are only for the purpose of showing dimensions and are not to indicate designs.

3. The vitreous china material used for plumbing fixtures listed herein shall meet the requirements of the absorption and crazing tests specified in paragraphs 43 and 44.

4. Glazed surfaces shall be thoroughly fused and united to the fixture body. All visible surfaces shall be glazed except those coming in contact with walls or floors. On lavatories set away from walls, those portions of the rear aprons used for supporting the fixtures in kilns, and also the back of overflows and underside of outlet boss, may be without glaze. The underside of water-closet tanks and lids need not be glazed. Other fixtures not mentioned herein may have unglazed portions at points where fixtures are supported in the kilns, but such unglazed surfaces must be in positions that are not visible when installed in the normal manner.

5. In addition to white, four basic colors are recognized as standard for vitreous china plumbing fixtures, namely, green, blue, ivory, and peach-brown. The shade or tint of each of these four colors is determined by each manufacturer, due to individual production problems.

6. Types and sizes of water-closet bowls, tanks, lavatories, urinals, service sinks, and other vitreous china plumbing fixtures not specifically mentioned are not classed as staple.

GRADING RULES

7. Vitreous china plumbing fixtures shall be graded in accordance with the grading rules as given herein.

8. The terms "first quality" and "culls" shall be used for grading vitreous china plumbing fixtures.

9. Careful inspection is employed in each department of manufacture, and each of the imperfections listed herein as acceptable under the "first quality" grading is caused by some unavoidable condition in the manufacturing process.

10. The blemishes permitted under the grading rules do not affect the utility value of the fixture or make it unsafe from a health or sanitary point of view.

11. It is not intended that inspectors shall measure or count any blemishes except in case of doubt, since, with practice, dimensional limits and numbers can be readily gaged by eye.

METHOD OF GRADING

12. Water-closet bowls are normally examined for minor blemishes with the eyes of the observer about 2 feet directly above the rim while the fixture is rocked to either side and backward to an angle of about 45°. Minor blemishes not observed in this operation are assumed to be on unseen surfaces.

13. Water-closet bowls, urinals, high tanks, sinks, laundry trays, service sinks and all pedestals and legs are graded in accordance with the maximum blemishes listed in table 1.

14. Low tanks are graded in accordance with the maximum blemishes listed in table 2. Examinations should be made with the eyes of the observer about 2 feet from the surface observed. No blemishes on the inside surface are counted. Minor blemishes on the outside surface, hidden by the cover, are not counted.

15. Covers shall show not more than 50 percent of the number of blemishes listed in table 2.

16. Lavatories are graded in accordance with the maximum number of blemishes listed in table 3. Lavatories should be examined with the eyes of the observer about 2 feet from the surface observed. (Pedestals and legs are graded the same as water-closet bowls.)

17. All vitreous china plumbing fixtures not specifically mentioned in the foregoing shall take the grading rules for water-closet bowls.

TABLE 1.—*Maximum blemishes for water-closet bowls, urinals, high tanks, sinks, laundry trays, service sinks, and all pedestals and legs*

Location	Blemish or defect	Maximum permitted
General	Dull or eggshell finish	Not over 4 square inches.
	Wavy finish	Not more than 4 square inches.
	Excess glaze	Not more than ⅛ inch thick in well.
	Warpage:	
	Water closets	Not noticeably warped when seat is attached.
	Other fixtures	Not more than ¼ inch per foot; total warpage not more than ½ inch.
	Large blisters	Not more than two.
	Dunts	None allowed.
	Projections	Do.
Flushing surface	Exposed body	None allowed.
	Fire check	Do.
	Spots, blisters, and pinholes	No segregation; a total of not over 10.
	Bubbles or specks	Not over 10 in 1 "pottery square"; a total of not over 25.
Visible surface	Exposed body	Not over ¼i nch on foot; not over ⅛ inch on more prominent surfaces (maximum dimension).
	Fire check	Not over ¼ inch long.
	Spots, blisters, and pinholes	No segregation; a total of not over 10.
	Bubbles or specks	Not over five in one "pottery square"; a total of not over 25.

TABLE 2.—*Maximum blemishes for low tanks and covers*

Location	Blemish or defect	Maximum permitted
General	Warpage	Not noticeably warped.
	Dunts	None allowed.
Visible surface	Dull or eggshell finish	None allowed on front; not over 2 square inches on each side.
	Wavy finish	Not more than 4 square inches.
	Exposed body	Not over ⅛ inch (maximum dimension).
	Fire check	None on front, one each side not over ¼ inch long.
	Spots, blisters, and pinholes	No segregation; a total of not over 10.
	Bubbles or specks	Not over five in one "pottery square"; a total of not over 25.

TABLE 3.—*Maximum blemishes for lavatories*

Location	Blemish or defect	Maximum permitted
General	Dunts	None allowed.
	Craze	Do.
	Warpage	Warpage of slab out of horizontal plane not to exceed ¼ inch on all sizes. (The same allowable deviation to apply to lavatories with back, when attached to wall.)
Service space, top of slab, insideof bowl and front of apron.	Dull or eggshell finish	One allowed, not over ½ inch.
	Exposed body	None allowed.
	Fire check	Do.
	Spots, blisters, and pinholes	No segregation; a total of not more than four.
	Bubbles and specks	Do.
	Polishing mark	Not more than two allowed.
Face of integral back and sides.	Dull or eggshell finish	One allowed, not over ½ inch.
	Exposed body	None over ½ inch, not more than two allowed.
	Large blisters	Not more than two on either side or on back; a total of not more than three.
	Fire check	None on back; one only allowed, which may be on either side.
	Spots, blisters, and pinholes	Not more than three on back or on either side, a total of not more than six.
	Bubbles or specks	No segregation; a total of not more than six.

DETAIL REQUIREMENTS

ALL FIXTURES

18. Vitreous china shall not be less than ¼ inch thick at any point; shall average not less than ⅜ inch thick, except in flush rims and parts forming overflows.

19. Variations from specified dimensions of not more than 5 percent plus or minus will be allowed except where minimum and maximum limits are specified.

20. The depth of seal of integral traps in all vitreous china plumbing fixtures shall be 2 inches minimum, except where greater depths are herein specifically required.

WATER-CLOSET BOWLS

21. *Flushing.*—Water-closet bowls covered by these standards shall pass the flushing test specified in paragraph 45, in order to be considered as having a satisfactory flushing action.

22. *Spud size.*—The standard size for spuds on all water-closet bowls shall be as follows: 2 inches for all water-closet bowls operated under low tanks; 1½ inches for all water-closet bowls operated under high tanks or direct flushing valves.

23. *Outlets.*—The outlets of water-closet bowls shall conform to dimensions shown in figure 1.

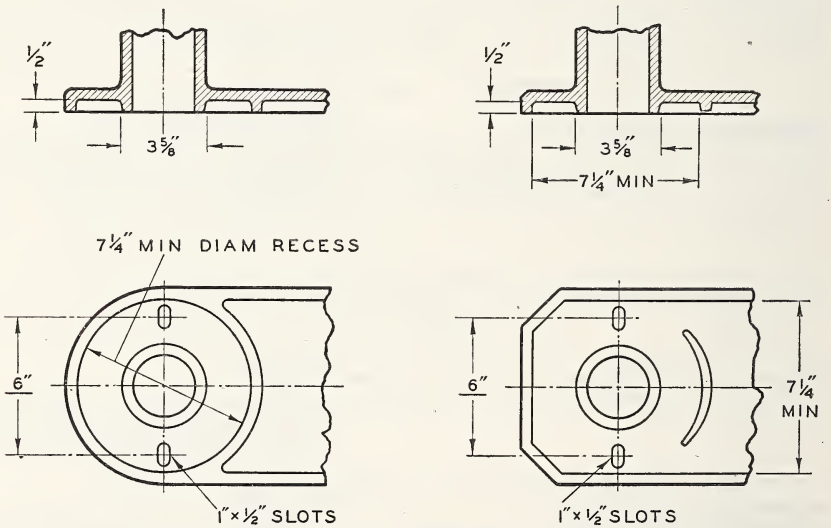


FIGURE. 1.—*Outlet of water closet bowl and pedestal urinal.*

Note. Designs of bases may vary from those shown, and the outlet horn either may or may not project beyond the base.

24. "*Juvenile*" height water-closet bowls shall be 13 inches minimum, 14 inches maximum from floor to top of rim, and shall have the same top contour as regular bowls (smaller or "baby" bowls are considered special).

25. *Combinations.*—The following water-closet combinations shall be considered staple. Classes of water-closet combinations shall be

further clarified by designating type of water-closet bowl involved, as "Direct flushing valve siphon jet water-closet combination", or "Direct flushing valve reverse trap water-closet combination".

25a. Close-coupled water-closet combination.—"Water-closet bowl" with separate tank which is secured to and supported by the "water-closet bowl".

25b. Direct-flushing-valve water-closet combination.—"Water-closet bowl" with direct flushing valve.

25c. High-tank water-closet combination.—"Water-closet bowl" with separately supported "high tank".

25d. Integral water-closet combination.—Single piece of china comprising "water-closet bowl" and tank.

25e. Low-tank water-closet combination.—"Water-closet bowl" and low separately supported tank, the bottom of which is mounted with respect to the water-closet bowl approximately as indicated in figure 2 herein. (See also figs. 4 and 7.)

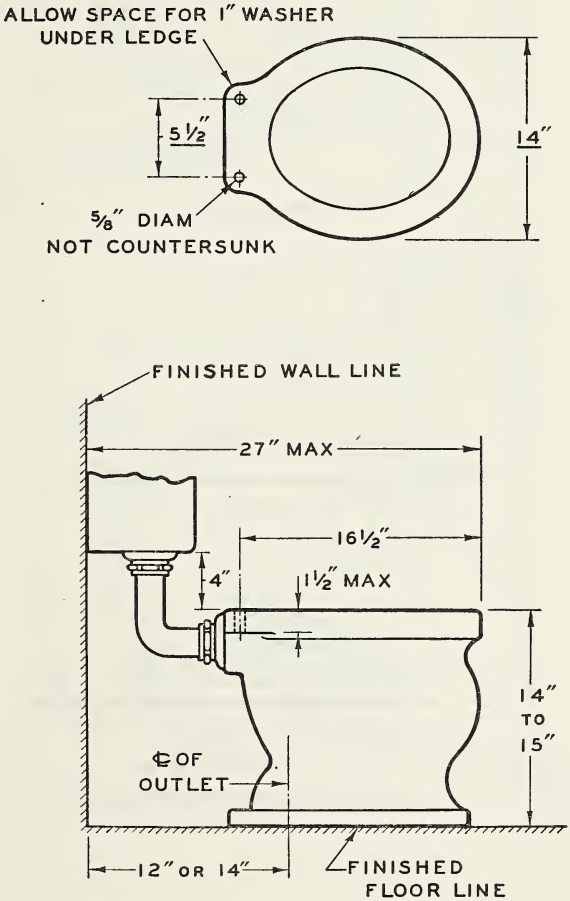


FIGURE 2.—*Low tank wash-down water-closet combination.*

Note. Underlined dimensions in all illustrations are identical for all sizes and types of similar items.

26. *Wash-down water-closet bowl.*—The term "wash-down" shall be applied to water-closet bowl having back supply (except for use as part of integral or close-coupled combination); integral flushing rim and jet; a minimum water surface of 8 by 7 inches; a minimum water seal of 2½ inches; a siphon trapway at the front of closet which shall pass a 1½-inch diameter solid ball. Minimum weight of back supply bowl, 31 pounds; minimum weight close-coupled bowl, 35 pounds. Bowls shall be as shown in figures 2 and 3.

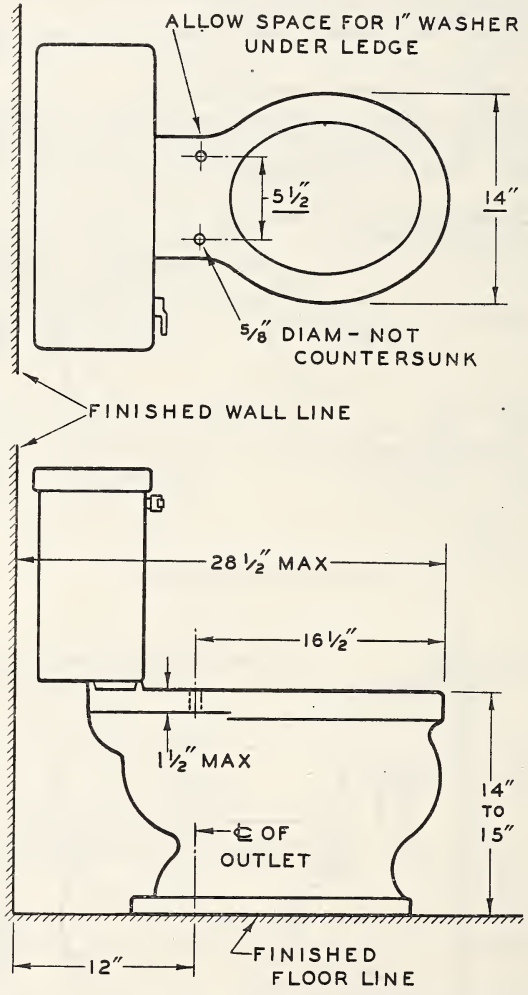


FIGURE 3.—*Close-coupled wash-down water-closet combination.*

27. *Reverse-trap water-closet bowl.*—The term "reverse-trap" shall be applied to water-closet bowls having back supply (except for use as part of integral or close-coupled combinations); integral flushing rim and jet; a minimum water surface of 8¾ by 7½ inches; a minimum water seal of 2½ inches; a siphon trap at the rear of closet which shall pass a 1½-inch diameter solid ball. Minimum weight of back supply bowl, 36 pounds; minimum weight close-coupled bowl, 40 pounds; minimum weight of integral combination less cover, 70 pounds. Bowls shall be as shown in figures 4, 5, and 6.

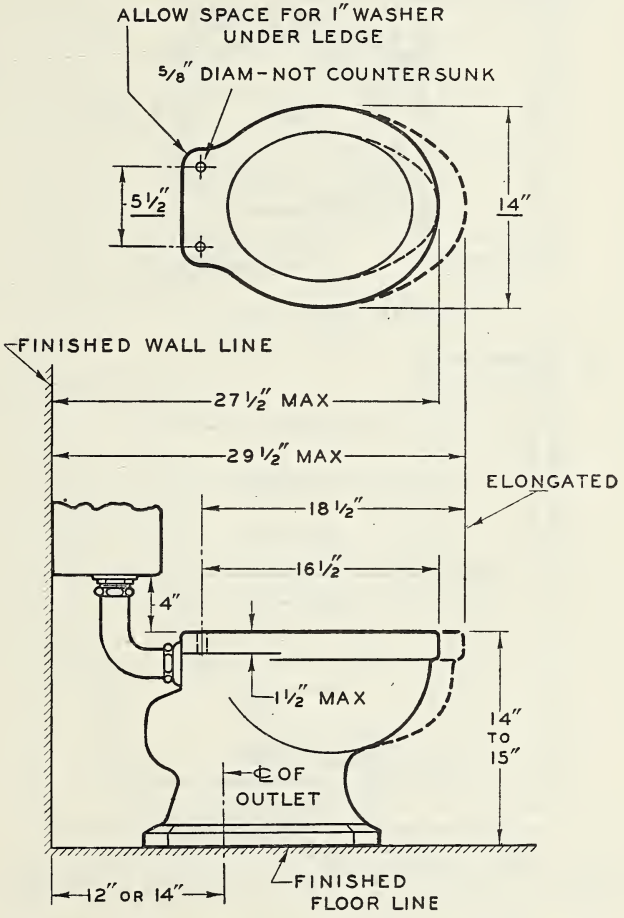


FIGURE 4.—*Low-tank reverse-trap water-closet combination.*

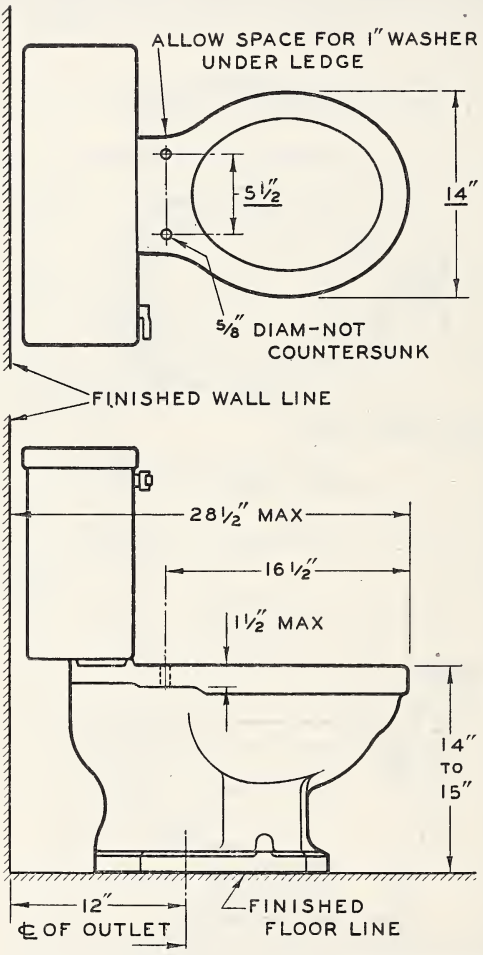


FIGURE 5.—*Close-coupled reverse-trap water-closet combination.*

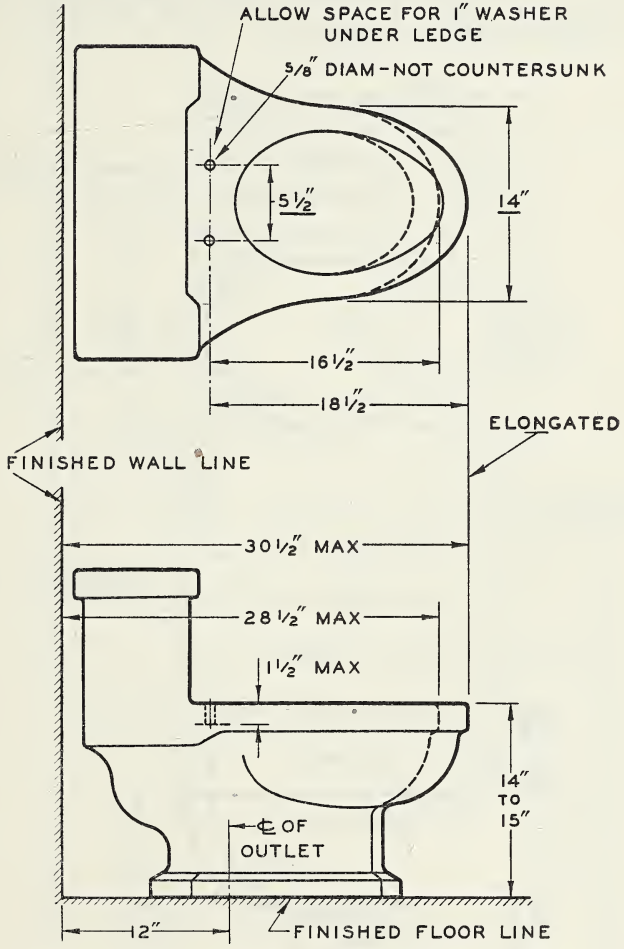


FIGURE 6.—*Integral reverse-trap water-closet combination.*

28. *Siphon-jet water-closet bowl.*—The term "siphon-jet" shall be applied to the water-closet bowl having top supply (except for use as part of close-coupled combination); integral flushing rim and jet; a minimum water surface of 12 by 10 inches; a minimum depth of seal of 3 inches; a siphon trapway at the rear of closet which shall pass a 2⅛-inch diameter solid ball. Minimum weight regular top supply bowl, 46 pounds; minimum weight close-coupled bowl, 48 pounds; minimum weight juvenile height bowl, 42 pounds. Bowls shall be as shown in figures 7 and 8.

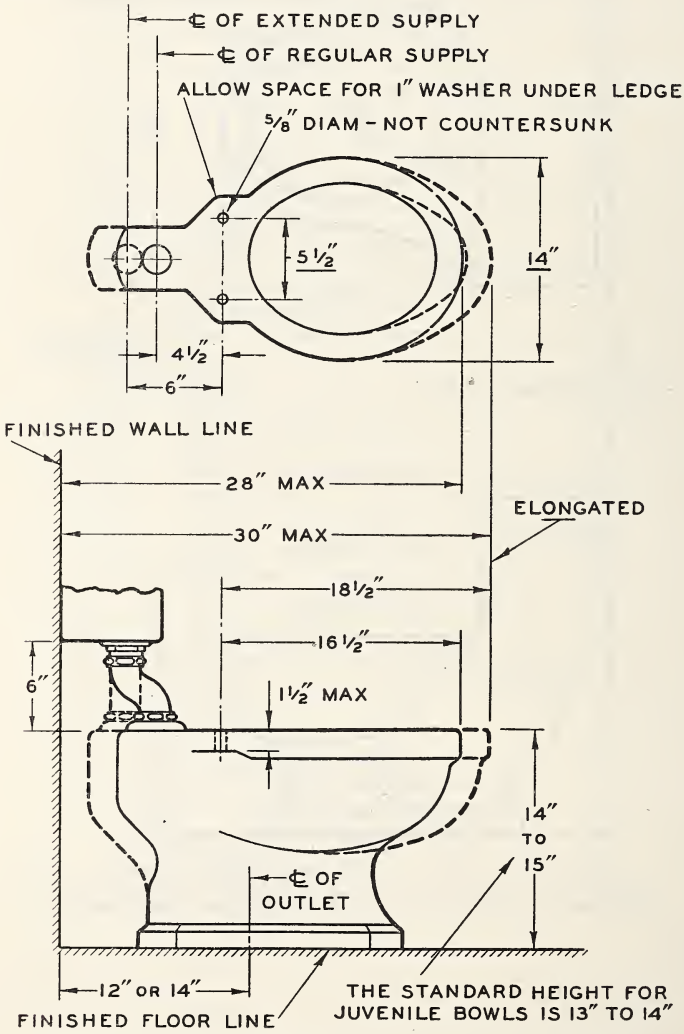


FIGURE 7.—*Low-tank siphon-jet water-closet combination.*

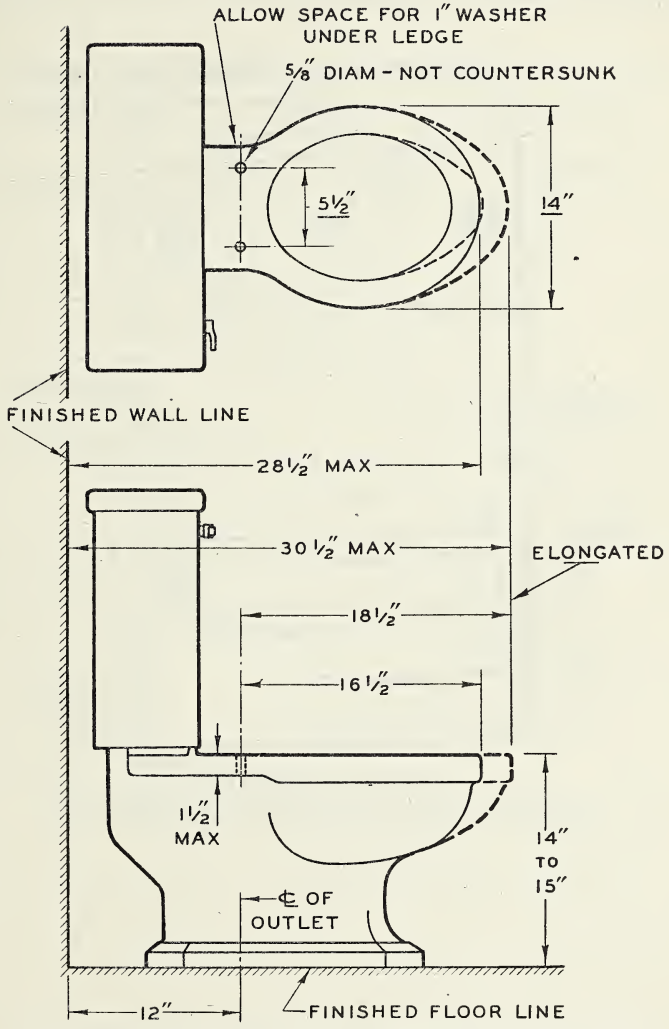


FIGURE 8.—*Close-coupled siphon-jet water-closet combination.*

29. *Blow-out wall-hanging water-closet bowls.*—The term "blow-out wall-hanging" shall be applied to wall closet bowls having top supply; integral flushing rim and jet; a minimum water surface of 12 by 10 inches; a minimum depth of seal of 3 inches; a trapway which shall pass a 2⅛-inch diameter solid ball. Minimum weight 43 pounds. Bowl shall be as shown in figure 9.

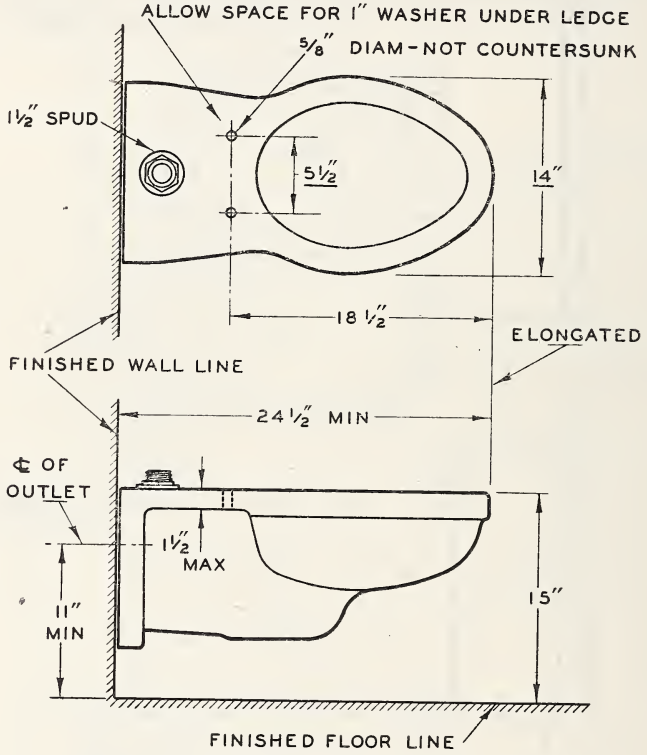


FIGURE 9.—*Blow-out wall-hanging water-closet bowl.*

30. *Siphon-jet wall-hanging water-closet bowl.*—The term "siphon-jet wall-hanging" shall be applied to wall closet bowl having top supply; integral flushing rim and jet, a minimum water surface of 12 by 10 inches; a minimum depth of seal of 3 inches; a siphon trapway which shall pass a 2⅛-inch diameter solid ball. Minimum weight 48 pounds. Bowl shall be as shown in figure 10.

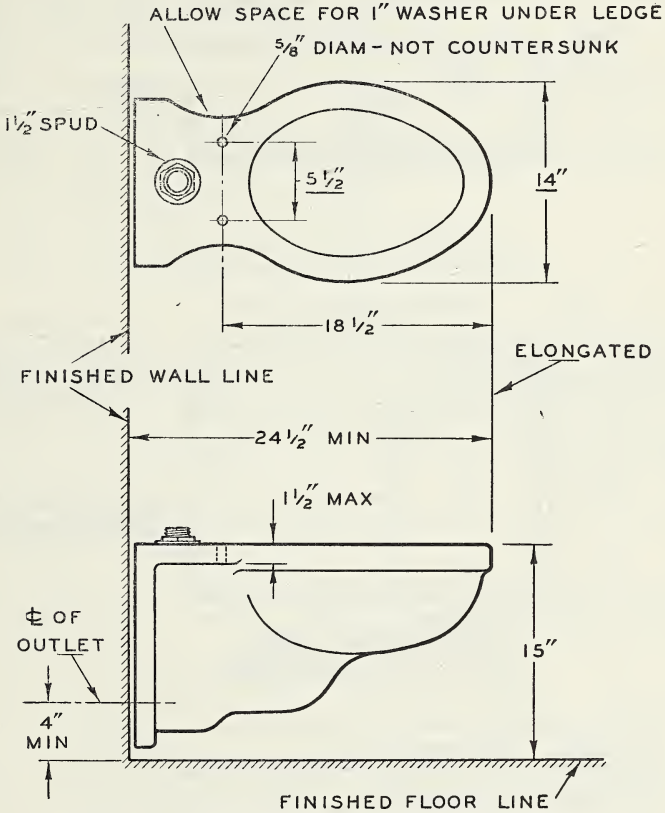
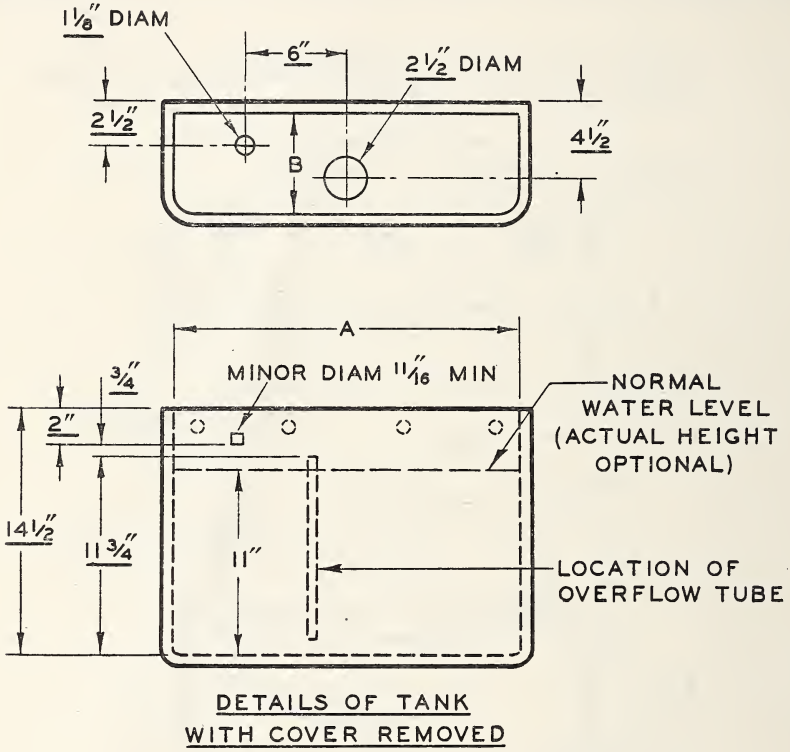


FIGURE 10.—*Siphon-jet wall-hanging water-closet bowl.*

TANKS

31. Staple low wall-hanging tanks shall be designated as either "18-inch low tanks" or "20-inch[1] low tanks", according to inside top dimension of the tank. The tanks shall be as shown in figure 11.



DETAILS OF TANK
WITH COVER REMOVED

SIZE	CAPACITY *	A	B
18 INCH	3½ GAL	18"	6"
20 INCH	4½ GAL	19¾"	6¾"

* ACTUAL FLUSH WITH SUPPLY SHUT OFF

FIGURE 11.—*Low tanks.*

[1] After this publication went to press, the elimination of the 20-inch tank as a staple item was recommended because of decreasing demand. Upon approval of this change, the standard will be modified accordingly, possibly by the issue of a supplement.

NOTE.—The following shall be furnished with "trimmed" staple low wall-hanging tanks:
1—Elevated float valve (ball cock) with refill tube and float ball rod.
1—Float.
1—Tank flush valve (Douglas pattern) with 2½-inch rubber ball and 1-inch minimum O. D. overflow tube 11¾ inches high, measured from inside bottom of tank.
1—Single or double acting operating lever.
1—2-inch O. D. elbow flush connection 5 by 6 inches maximum, complete with nuts and rubber washers, *or*
1—2 by 6-inch straight or offset flush connection with nuts and rubber washers.
2—Wood screws with washers or hooks for tank.
The following item is optional according to understanding between buyer and seller:
1—2-inch spud escutcheon, where required. (Supply pipe and supply pipe escutcheon are listed as separate fittings, not as trim.)

32. High tanks for water-closets shall be for chain pull with lever on left-hand side. High tanks for urinals shall have automatic flush valves. The following sizes are staple:

No. 1. (To flush approximately 1½ gallons).
No. 3. (To flush approximately 3 gallons).
No. 4. (To flush approximately 4½ gallons).

LAVATORIES

33. Lavatory shall be of one-piece vitreous china with oval, rectangular or D-shaped bowl, apron and front antisplash rim. Lavatories shall have integral overflow at front or back with cross-sectional area not less than 1⅛ square inches at every point. Overflow point of slab shall be not more than ½-inch above slab surface at lowest point of any faucet bearing.

34. The location of holes for faucets, spouts, drains, etc., shall be as shown in figures 12, 13, and 14, inclusive.

35. *Faucet-hole spacing.*—

35a. Center-set fittings. The standard faucet-hole spacing for center-set fittings is 4 inches center-to-center, in top of or in front of the shelf or the ledge in either shelf-back or ledge-back lavatories; and in lavatories with or without back.

35b. Separate faucets and combination fittings. The standard faucet-hole spacing for separate faucets and combination fittings is 8 inches center-to-center, in top of or in front of the shelf or the ledge in either shelf-back or ledge-back lavatories; and in all staple pattern lavatories with or without back, except where impractical and where commercial practice requires 10- or 12-inch spacing.

36. Shelf-back and ledge-back lavatories are made in varying sizes ranging from 12 by 12 inches to 30 by 22 inches, the most popular of which are 18 by 15, 19 by 17, 20 by 18, 22 by 18, and 24 by 20 inches; and up to 26 by 14 inches in several space-saver sizes. The sizes and dimensions of these lavatories are not standardized, but the applicable requirements of this standard apply in all other respects. These items are not illustrated.

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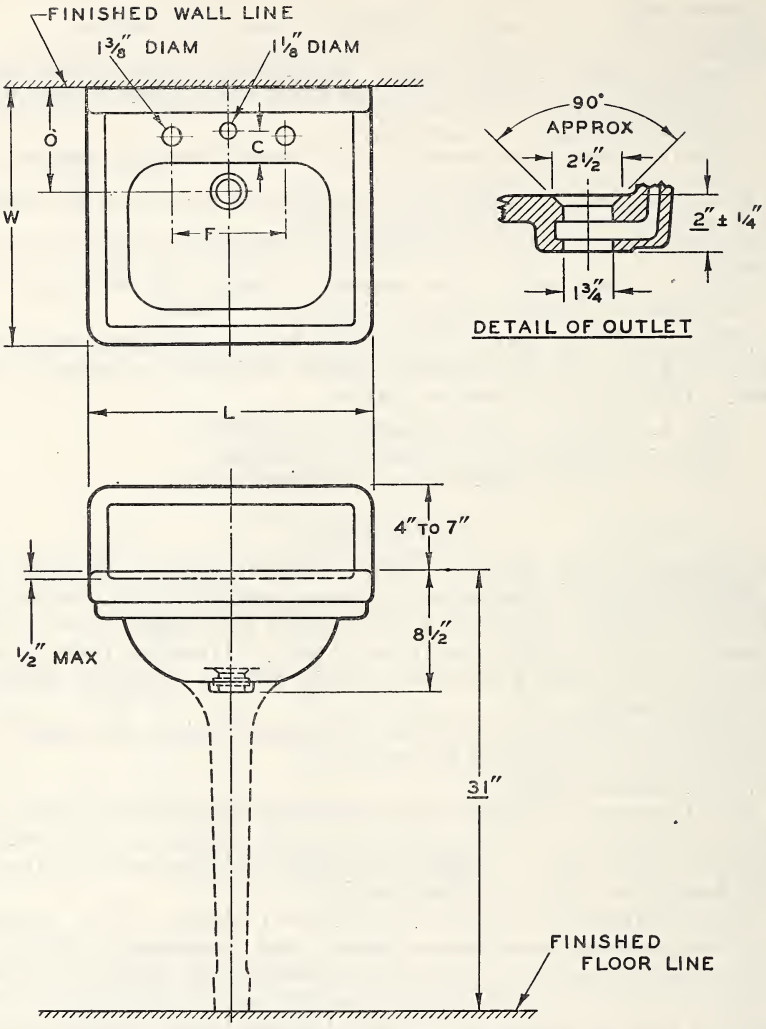
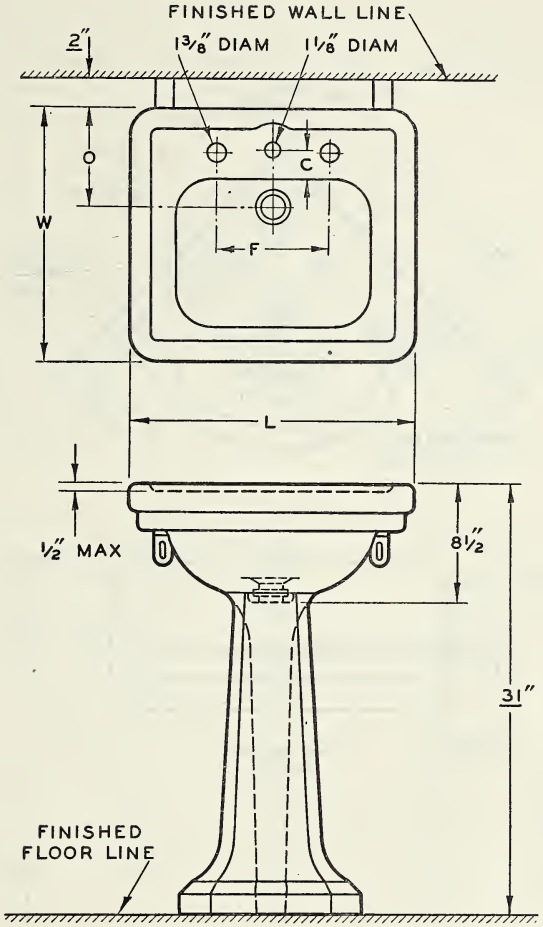


NOMINAL SIZE	L	W	F NOTE 1	O NOTE 2	C NOTE 3
20" x 18"	20"	18"	8"	7½"	2½"
24" x 20"	24"	20"	8"	8"	2½"

NOTE 1. DIMENSION F MAY BE 4" FOR CENTERSET FITTINGS; AND MAY BE 10" OR 12" (SEE PAR. 35).
NOTE 2. TOLERANCE ±¾" ON DIMENSION O.
NOTE 3. TOLERANCE ±½" ON DIMENSION C.

FIGURE 12.—*Straight-front lavatories, with back.*



NOMINAL SIZE	L	W	F NOTE 1	O NOTE 2	C NOTE 3
20″ x 18″	20″	18″	8″	7 1/2″	2 1/2″
24″ x 20″	24″	20″	8″	8″	2 1/2″
27″ x 22″	27″	22″	8″	8 1/2″	2 1/2″

NOTE 1. DIMENSION F MAY BE 4″ FOR CENTERSET FITTINGS; AND MAY BE 10″ OR 12″ (SEE PAR. 35).
NOTE 2. TOLERANCE ± 3/4″ ON DIMENSION O.
NOTE 3. TOLERANCE ± 1/2″ ON DIMENSION C.

FIGURE 13.—*Straight-front lavatories, without back.*

Note. For detail of outlet, see fig. 12.

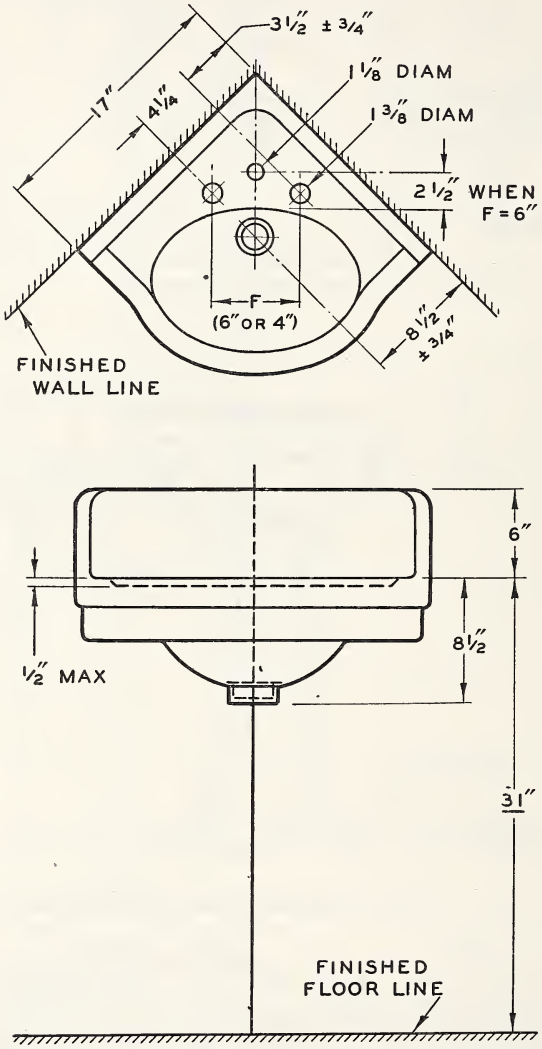


FIGURE 14.—*Round-front corner lavatory, with back.*

Note. For detail of outlet, see fig. 12.

URINALS

37. Stall urinal shall be one-piece vitreous china with straight front and integral flushing rim, as shown in figure 15. There are two standard sizes of plain seam covers for stall urinals, one for urinals installed on 21-inch centers, and one for 24-inch centers. It is recommended that winged seam covers be eliminated.

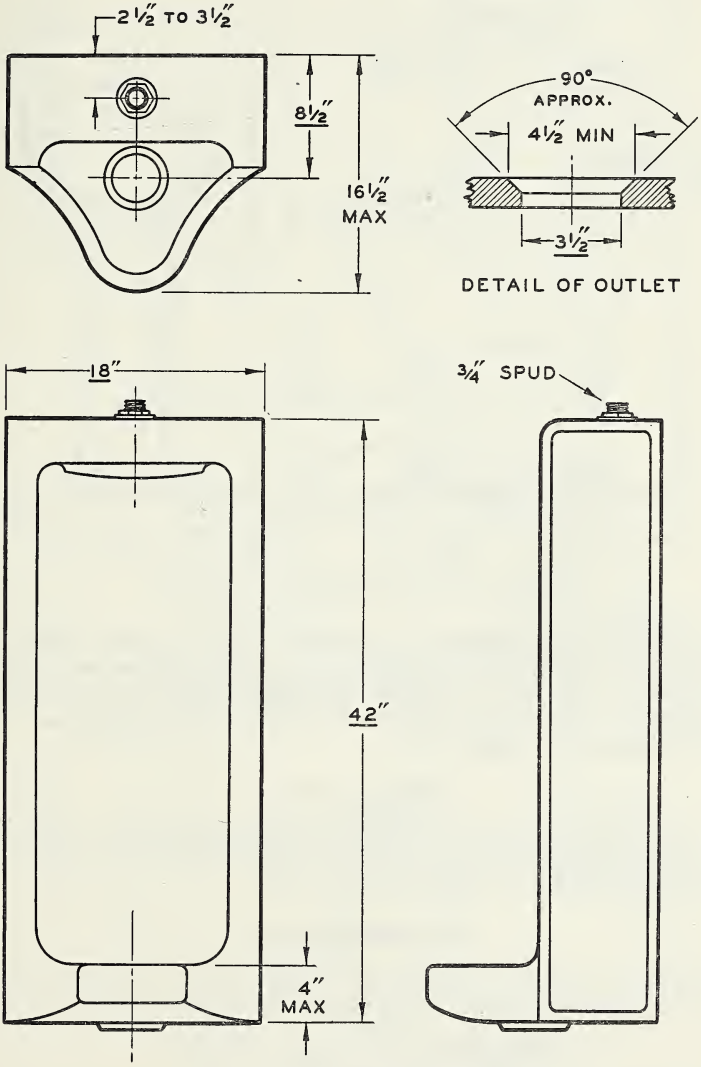


FIGURE 15.—*Stall urinals.*

38. Pedestal urinal shall be of vitreous china with integral flush rim, siphon jet, top inlet, and pedestal base with siphon trap, all molded in the ware. The depth of the water seal shall be not less than 2 inches and the siphon trapway shall pass a solid ball not less than 1½ inches in diameter. See figure 16.

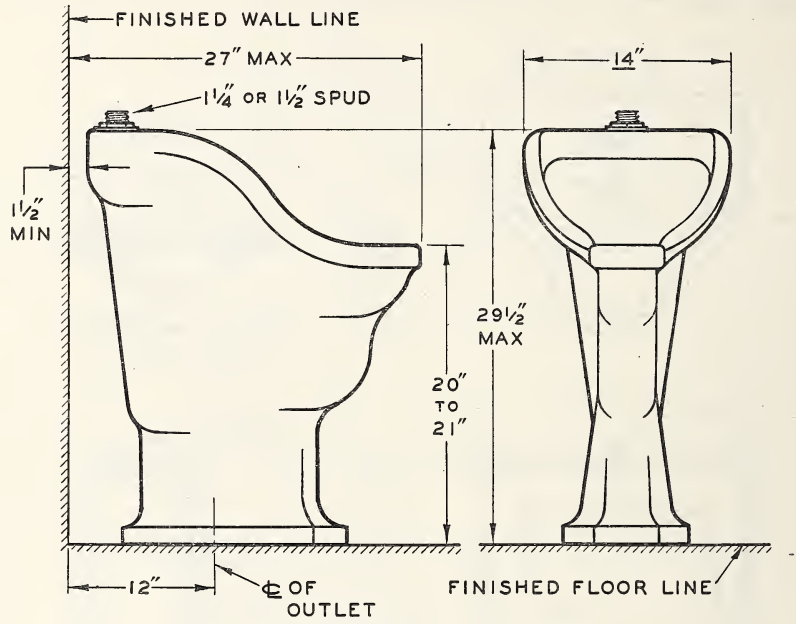


FIGURE 16.—*Top-supply pedestal urinal.*

39. Wall-hanging wash-out urinal shall be of vitreous china and of wash-out type with integral flushing rim, trap, and extended shields, all molded in the ware. Fixture may have integral cast strainer or open trapway. The water seal shall not be less than 2 inches. Urinal shall be as shown in figure 17.

SERVICE SINKS

40. Vitreous china service sink shall be of one-piece vitreous china with integral back and with space behind back for supplies. The service sink shall be as shown in figure 18.

FLAT-RIM SINKS

41. Vitreous china flat-rim sink shall be of one-piece vitreous china, rectangular in shape, as shown in figure 19.

FLAT-RIM LAUNDRY TRAYS

42. Vitreous china flat-rim laundry tray shall be of one-piece vitreous china, rectangular in shape, as shown in figure 20.

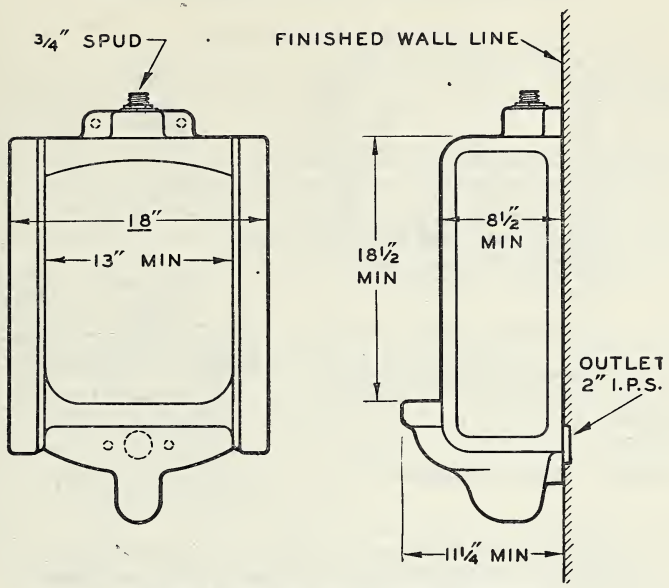


FIGURE 17.—*Wall-hanging wash-out urinal.*

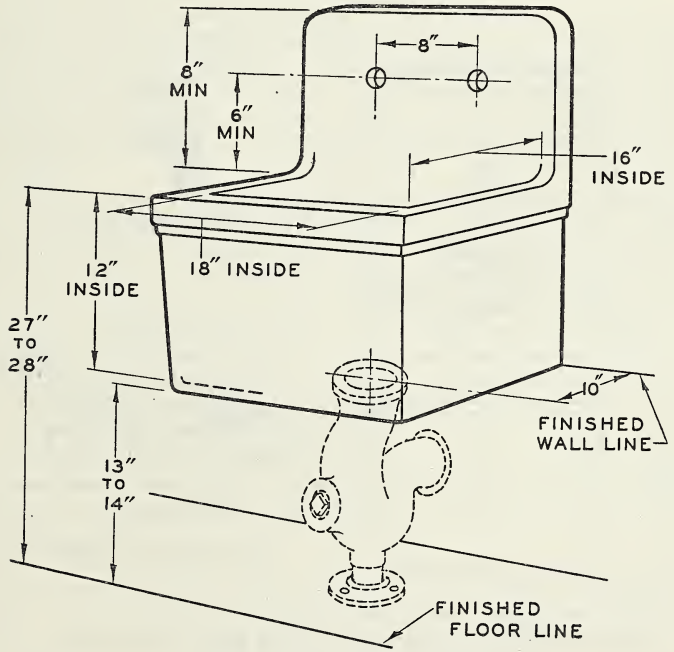
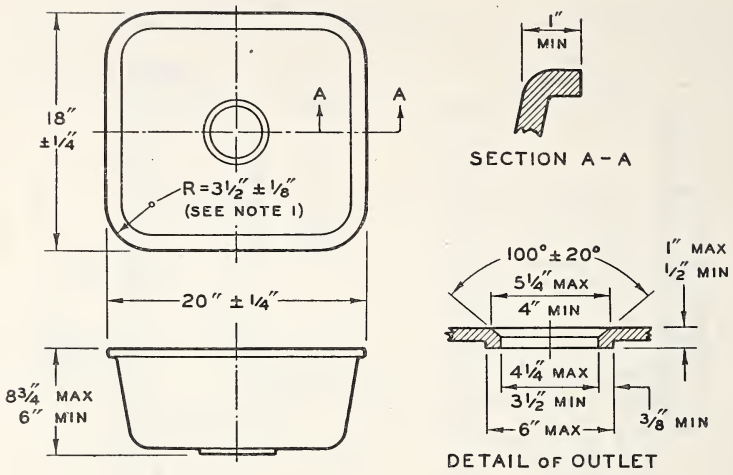
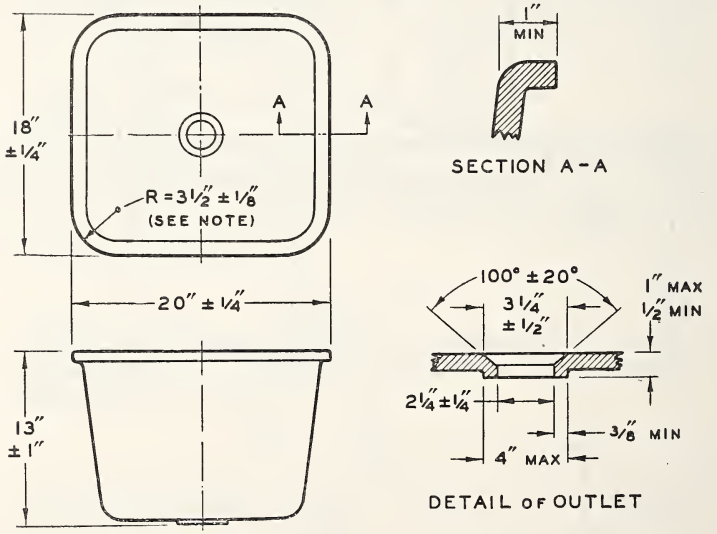


FIGURE 18.—*Service sink.*



NOTE 1. RADIUS "R" MAY BE 4-3/8″ ± 1/8″ AS AN ALTERNATE.
NOTE 2. IF OTHER SIZES ARE MADE THEY SHALL CONFORM TO ALL DIMENSIONS SHOWN ABOVE EXCEPT LENGTH AND WIDTH.

FIGURE 19.—*Flat-rim sink.*



NOTE.- DIMENSION "R" MAY BE 4-3/8″ ± 1/8″ AS AN ALTERNATE.

FIGURE 20.—*Flat-rim laundry tray.*

METHODS OF TEST

43. *Absorption test.*—Either the red-ink test or the boiling test as described below may be used, but in cases of dispute the boiling test shall be used.

43a. *Red-ink test.*—A fractured piece of material taken from any part of a vitreous-china plumbing fixture, after being immersed in red aniline ink of good color strength for 1 hour, shall not show any discoloration through the glaze and shall not show absorption, when broken, to a depth greater than ⅛ inch below the surface of fracture at any point.

43b. *Boiling test.*

43b (1). The test sample shall be three fragments taken from any part of the fixture. Each fragment shall have approximately 5 square inches of surface area and a thickness of not more than ⅝ inch. The pieces shall be dried to constant weight at 230°±10° F., and shall then be stored in a desiccator until cooled to room temperature. After reaching room temperature, each specimen shall be weighed on a balance to an accuracy of 0.1 gram.

43b (2). The weighed pieces shall then be placed in distilled water in a suitable vessel, supported so that they shall not be in contact with the heated bottom of the container, and boiled for two hours. They shall then be allowed to remain in the water for 20 hours, then each dried slightly with a damp towel to remove excess water, and reweighed to an accuracy of 0.1 gram.

43b (3). The absorption shall be reported as a percentage of the weight of the dried sample. The percentage for each test piece is obtained by dividing the weight of the water absorbed, in grams, by the weight of the dried test piece, in grams, and multiplying by 100. The average absorption of the three test pieces shall not exceed ½ of 1 percent.

44. *Crazing test.*—A test specimen not more than ⅝ inch in thickness by 5 inches square shall be suspended in a solution of equal portions, by weight, of anhydrous calcium chloride and water and then boiled at a constant temperature of 230°±5° F. for 1½ hours. It shall then be removed and immediately plunged into an ice-water bath of 36° to 38° F. until chilled. The specimen shall then be soaked for 12 hours in a concentrated solution of methylene-blue dye, after which it shall be examined for craze lines as indicated by penetration of the blue dye. No crazing is permissible.

45. *Flushing test for water-closet bowls.*

45a. Paper.—The standard size paper to be used in this test is 4½ by 5 inches. If smaller or larger size is used, the load should be increased or decreased proportionately, based on the square inches of surface per sheet.

45b. For interfold (pack type) toilet paper, six sheets in all is considered equivalent to one six-sheet strip of single roll paper.

45c. The "test load" for the flushing test shall be as given in the following tabulation, depending upon the absorption time of the paper used.

Paper absorption time, double-strip method, seconds	0 to 3	4 to 6	7 to 15
Number of crumpled 6-sheet strips of single-thickness roll toilet paper	7	6	5

45d. *Method for determining absorption time of paper.*—To determine the absorption time of roll toilet paper by the double-strip method, take two two-sheet strips of paper and place them together with perforations in line, and with curvature from roll in same direction in order to insure uniform contact.

45e. These two strips shall then be placed gently on the surface of the water with convex side of paper down. The time in seconds shall be recorded from the moment the paper touches the water until a spot of moisture approximately ⅛ inch in diameter appears on the upper strip. Spots appearing through imperfections in the paper or at edges shall be ignored. (This test can best be made in a lavatory basin or sink where light is usually better than in closet bowl.)

45f. The absorption time of interfold (pack-type) paper shall be determined in the same manner as roll toilet paper, after first cutting the interfold sheets where folded, then placing the two sheets on the surface of the water.

45g. *Procedure for actual testing.*—The bowl shall be level, the trap and outlet clear, the bowl filled to weir level, the tank filled to the water line where marked and, in the absence of a mark, to a point 1 inch below top of overflow, and the float valve (ball cock) shall be adjusted to fill tank in not more than three minutes.

45h. The given number of six-sheet strips of roll toilet paper as determined by absorption time, shall each be crumpled into a loose ball measuring 2 to 3 inches in diameter and dropped altogether as a "test load" into the bowl and the bowl flushed immediately. The bowl shall flush similar "test loads" repeatedly without clogging.

45i. If interfold (pack-type) paper is used, six sheets shall be crumpled into a ball and the test made as outlined above for roll paper.

45j. No paper other than common toilet paper, coming within the absorption time range as mentioned above, shall be used for test.

45k. When water closets to be tested are connected to direct flushing valves, the control stop and valve should first be adjusted for best flushing action. The flow pressure (maintained at the flushing-valve inlet during test) shall not be less than:

10 pounds per square inch for siphon-action closets.

20 pounds per square inch for blow-out closets.

46. *Method of determining warpage.*—The fixture shall be placed on a flat surface so as to ascertain the amount of deviation from the horizontal plane that exists at the edges of the fixture. If a feeler gage of thickness equal to the total allowable warpage will not slide under the fixture without forcing, the fixture satisfactorily comes within the warpage limitations. If the fixture will rock on two opposite high corners, the horizontal plane shall be determined by placing one feeler gage, of the total warpage allowed, under one low corner and forcing the fixture down on this gage. If a second feeler gage of the same thickness will not slide under the fixture at any other point, the fixture is not warped out of the horizontal plane by more than the

specified tolerance, and satisfactorily comes within the warpage limitations.

MARKING AND LABELING

47. All vitreous china plumbing fixtures shall be plainly and permanently branded for identification with the name or trade-mark of the manufacturer.

48. Labels shall be used only on such ware as conforms to the requirements for "first quality" as set forth in this commercial standard. The following uniform wording is recommended for incorporation into labels:

> The manufacturer declares this vitreous china plumbing fixture to be first quality and to meet the grading standards and tests of Commercial Standard CS20–47 as issued by the National Bureau of Standards of the United States Department of Commerce.

49. The industry has been embarrassed and the consumer victimized by unscrupulous distributors selling "cull" grade fixtures as "first quality" fixtures. In order to prevent the possibility of this unfair practice, all "cull" grade ware shall be indelibly marked by the maker with two parallel lines cut through the glaze into the body of the ware at the location (see fig. 21) recommended by the Manufacturers' Advisory Committee on Vitreous China Plumbing Fixtures. These cuts shall be filled with a bright red varnish or enamel which is resistant to the action of hot water. No labels shall be placed on "culls".

50. All packages containing "culls" shall be marked with two splashes of red on one end of the package so as to be visible without tearing down stacks of packages.

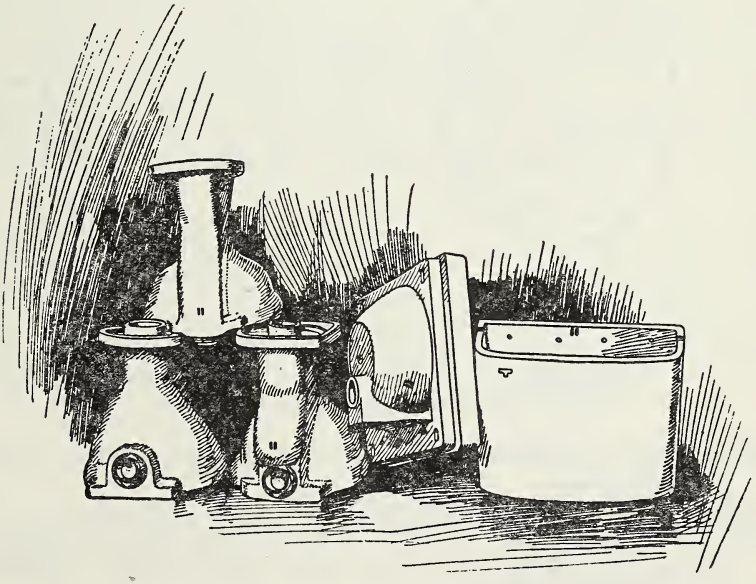


FIGURE 21.—*Location and character of marking for culls.*

NOMENCLATURE AND DEFINITIONS

Blister.—A raised portion of the surface 1/32 (0.031) inch and less than 1/8 (0.125) inch in maximum dimension.

Large blister.—A raised portion of the surface 1/8 (0.125) inch to 1/4 (0.25) inch, inclusive, in maximum dimension.

Bubble.—A raised portion of the surface or a sand speck smaller than 1/32 (0.031) inch in maximum dimension.

Craze.—Fine cracks in the glaze.

Culls.—Serviceable ware which grades below "first quality" but which is safe from a health or sanitary point of view.

Discoloration.—A colored spot over 1/4 (0.25) inch in maximum dimension, or a sufficient number of specks or spots to give the effect of a change in color.

Dull or eggshell finish.—Dead or flat finish. Undeveloped glaze. A semiglazed finish with numerous very fine pinholes or slightly matted in appearance. Not glossy.

Dunt.—A hair line fracture extending through the body, and caused by strains set up in the process of manufacture.

Elongated water-closet bowl.—Water-closet bowl having an elongated top contour as shown in figure 22.

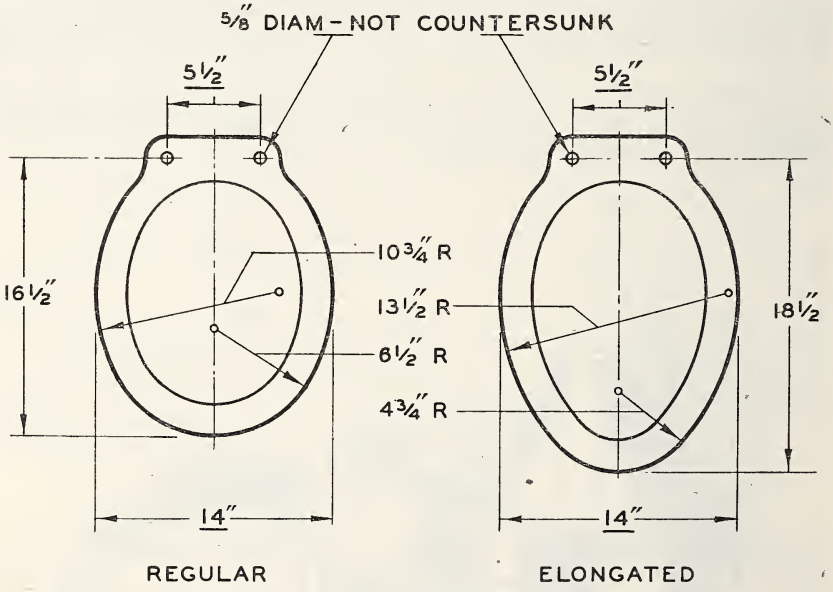


FIGURE 22.—*Top contour for water-closet bowls.*

Exposed body.—Unglazed portion 1/16 (0.063) inch or more in maximum dimension.

Finish.—Texture and condition of surface other than color.

Fire check.—Fine shallow crack in the body not covered with glaze. (When sufficiently covered with glaze as to be easily cleaned, it is not detrimental.)

First quality.—First class ware in conformity with the limitations of the grading rules.

Fittings.—Adjuncts to a fixture subject to selection or option of the purchaser, as, for example, faucets and waste plugs.

Fixture.—The china piece only, without "trimmings" and/or "fittings."

Flushing surface.—The surface, visible after installation, which may be wet during the operation of the fixture.

Ledge back.—A flat ledge at the back of a lavatory or sink, not more than 2 inches higher than the rim and extending the full length of the fixture, on which the supply fitting can be mounted and small articles can be placed.

Pinhole.—Unglazed portion of body, or small hole under 1/16 (0.063) inch in maximum dimension.

Polishing mark.—A spot not larger than 3/8 (0.375) inch in maximum dimension where some minor blemish has been ground off and the surface polished.

Pottery square.—A square 2 inches on each side. For grading purposes, it may be a 2-inch square hole cut in a small sheet of any flexible material, such as rubber or paper, for convenience in sliding over irregular surfaces to determine segregation.

Projection.—A raised portion of the surface over 1/4 (0.25) inch in maximum dimension.

Regular (round front) water-closet bowl.—A water-closet bowl having a round front rim. See figure 22.

Roughing-in measurement.—Dimension from finished wall or floor to center of waste or supply opening.

Segregation.—More than four spots, blisters, or pinholes in any "pottery square."

Shelf back.—A flat elevation at the back of a lavatory, higher than 2 inches above the rim and extending the full length of the fixture, on the top or front of which the supply fitting can be mounted and on which small articles can be placed.

Speck.—A colored portion less than 1/32 (0.031) inch in maximum dimension. Specks less than 1/100 (0.01) inch in maximum dimension, unless in sufficient number to form a discoloration, are not counted.

Spot.—A colored portion of the surface 1/32 (0.031) inch to 1/8 (0.125) inch in maximum dimension.

Large Spot.—A colored portion 1/8 (0.125) inch to 1/4 (0.25) inch, inclusive, in maximum dimension.

Spud.—Threaded brass connection inserted in the vitreous chinaware.

Tank.—The term tank shall be applied to any vitreous china fixture which contains water to flush another plumbing fixture.

High tank.—Designed to be mounted with bottom more than 2 feet above the floor.

Low tank.—Designed to be mounted with bottom 2 feet or less above the floor.

Trap.—A device so constructed as to prevent the passage of air through a fixture without materially affecting the flow of sewage or waste through it.

Trimmings.—Parts, other than china, regularly supplied with a fixture, as, for example, closet spuds, wall hangers, and tank trim; do not include "fittings."

Visible surface.—The surface which, after installation of the fixture, is readily visible to an observer in normal standing position.

Vitreous china.—Vitreous china is a homogeneous mixture of ceramic materials bonded by fusion of these materials at high temperatures. Composition and heat treatment is such as to result in a body so impervious to moisture penetration that it will not absorb more than one-half of one percent of its weight of water when subjected to an absorption test as specified herein.

Vitreous china plumbing fixtures.—The term "vitreous china" shall be applied only to such plumbing fixtures as will pass the absorption and crazing tests specified herein.

Water surface.—The surface of the still water in the water-closet bowl, when filled to the top of the dam.

Water-closet bowl.—The term "water-closet bowl" is the accepted general term applicable to such fixtures whether singly or part of a "combination."

Water-closet combination.—The term "water-closet combination" applies to a "water-closet bowl" with means for flushing.

Wavy finish.—A defect in the finish having the appearance of numerous runs in the glaze; irregular or mottled.

Well.—A pocket, open at top, formed inside a water-closet bowl at the entrance to the trap.

RECOMMENDED PROVISIONS

51. It is recommended that the industry work towards one standard roughing-in dimension for water-closet bowls and that this dimension be 12 inches.

EFFECTIVE DATE

52. The revised standard is effective as a voluntary standard of the trade from July 12, 1947.

STANDING COMMITTEE

The following individuals comprise the membership of the standing committee, which is to review, prior to circulation for acceptance, revisions proposed to keep the standard abreast of progress. Each organization nominated its own representatives. Comment concerning the standard and suggestions for revision may be addressed to any member of the committee or to the Division of Trade Standards, National Bureau of Standards, which acts as secretary for the committee.

HUGH R. VAN SCIVER, *Chairman*

HUGH R. VAN SCIVER, The Trenton Potteries Co., Trenton, N. J.
D. D. COUCH, American Radiator & Standard Sanitary Corporation, Pittsburgh, Pa.
A. G. ZIBELL, Kohler Company, Kohler, Wis.
B. B. PIESLAK, Abingdon Potteries, Inc., Abingdon, Ill.
A. V. GEMMILL, Speakman Co., Wilmington, Del.

Jere L. Murphy, Chairman Standardization Committee, National Association of Master Plumbers of the United States, Inc.
W. J. Spillane, Jas. B. Clow & Sons, Chicago, Ill.
C. W. Owen, E. G. Schafer & Co., Washington, D. C.
Benjamin Cadbury, Hajoca Corporation, Philadelphia, Pa.
Theodore I. Coe, Washington, D. C. (Representing American Institute of Architects.)
G. R. Studebaker, U. S. Public Health Service, Washington, D. C. (Representing American Hospital Association).

HISTORY OF PROJECT

General conference.—Pursuant to a request from the industry and following several preliminary conferences of interested manufacturers, a public conference was held September 22, 1926, which resulted in the establishment of Simplified Practice Recommendation R52, Staple Vitreous China Plumbing Fixtures. On recommendation of the Standing Committee, this was expanded and superseded by a pamphlet entitled "Staple Vitreous China Plumbing Fixtures, Commercial Standard CS20–30," effective for new production March 3, 1930.

First revision.—In response to a demand for standards on additional types of fixtures, as well as for additional definitions and revisions, the Vitreous China Plumbing Fixtures Association submitted recommended revisions on February 10, 1936, which were subsequently approved by the Standing Committee, and on April 28, 1936, were circulated to all concerned for written acceptance. As announced to the trade under date of June 30, 1936, the revised standard was accepted as Commercial Standard CS20–36, effective for new production from September 30, 1936.

Second revision.—On January 8, 1942, the Vitreous China Plumbing Fixtures Association submitted recommendations for revision of the standard to include several additional items and three new tests. With the approval of the Standing Committee, the revision was circulated to the industry on May 4, 1942, and following receipt of satisfactory written acceptance, the third edition, CS20–42, was announced on June 10, 1942.

Third revision.—Further changes were recommended on April 19, 1946, by the Vitreous China Plumbing Fixtures Association, to bring certain details in line with developments in the industry and to include two additional items. Upon circulation to the industry December 27, 1946, following approval by the Standing Committee, the revision was accepted in writing by a satisfactory majority, and the fourth edition was announced on June 12, 1947.

ACCEPTANCE OF COMMERCIAL STANDARD

If acceptance has not previously been filed, this sheet properly filled in, signed, and returned will provide for the recording of your organization as an acceptor of this commercial standard.

Date _____

Division of Trade Standards,
National Bureau of Standards,
Washington 25, D. C.

Gentlemen:

We believe that the Commercial Standard CS20–47 constitutes a useful standard of practice, and we individually plan to utilize it as far as practicable in the

Production [1] Distribution [1] Purchase [1] Testing [1]

of staple vitreous china plumbing fixtures.

We reserve the right to depart from it as we deem advisable.

We understand, of course, that only those articles which actually comply with the standard in all respects can be identified or labeled as conforming thereto.

(Cut on this line)

Signature of authorized officer _____
(In ink)

(Kindly typewrite or print the following lines)

Name and title of above officer _____

Organization _____
(Fill in exactly as it should be listed)

Street address _____

City, zone, and State _____

[1] Underscore which one. Please see that separate acceptances are filed for all subsidiary companies and affiliates which should be listed separately as acceptors. In the case of related interests, trade associations, trade papers, etc., desiring to record their general support, the words "General support" should be added after the signature.

TO THE ACCEPTOR

The following statements answer the usual questions arising in connection with the acceptance and its significance:

1. *Enforcement.*—Commercial standards are commodity specifications voluntarily established by mutual consent of those concerned. They present a common basis of understanding between the producer, distributor, and consumer and should not be confused with any plan of governmental regulation or control. The United States Department of Commerce has no regulatory power in the enforcement of their provisions, but since they represent the will of the interested groups as a whole, their provisions through usage soon become established as trade customs, and are made effective through incorporation into sales contracts by means of labels, invoices, and the like.

2. *The acceptor's responsibility.*—The purpose of commercial standards is to establish for specific commodities, nationally recognized grades or consumer criteria and the benefits therefrom will be measurable in direct proportion to their general recognition and actual use. Instances will occur when it may be necessary to deviate from the standard and the signing of an acceptance does not preclude such departures; however, such signature indicates an intention to follow the commercial standard where practicable, in the production, distribution, or consumption of the article in question.

3. *The Department's responsibility.*—The major function performed by the Department of Commerce in the voluntary establishment of commercial standards on a Nation-wide basis is fourfold; first, to act as an unbiased coordinator to bring all interested parties together for the mutually satisfactory adjustment of trade standards; second, to supply such assistance and advice as past experience with similar programs may suggest; third, to canvass and record the extent of acceptances and adherence to the standard on the part of producers, distributors, and users; and fourth, after acceptance, to publish and promulgate the standard for the information and guidance of buyers and sellers of the commodity.

4. *Announcement and promulgation.*—When the standard has been endorsed by a satisfactory majority of production or consumption in the absence of active valid opposition, the success of the project is announced. If, however, in the opinion of the Standing Committee or the Department of Commerce, the support of any standard is inadequate, the right is reserved to withhold promulgation and publication.

ACCEPTORS

The organizations listed below have individually accepted this standard for use as far as practicable in the production, distribution, testing, or purchase of staple vitreous china plumbing fixtures. In accepting the standard they reserved the right to depart therefrom as they individually deem advisable. It is expected that articles which actually comply with the requirements of this standard in all respects will be regularly identified or labeled as conforming thereto, and that purchasers will require such specific evidence of conformity.

ASSOCIATIONS

(General Support)

American Homemakers Association, Lorain, Ohio.
American Society of Sanitary Engineering, McKeesport, Pa.
American Specification Institute, Chicago, Ill.
Building Officials Conference of America, Inc., Washington, D. C.
Central Supply Association, The, Chicago, Ill.
Clay Products Association, Chicago, Ill.
National Association of Master Plumbers, New York, N. Y.
Northern Kentucky Master Plumbers Association, Bellevue, Ky.
Prefabricated Home Manufacturers' Institute, Washington, D. C.
Vermont Master Plumbers Association, Windsor, Vt.
Virginia Associated Plumbing & Heating Contractors, Inc., Richmond, Va.
Vitreous China Plumbing Fixtures Association, Washington, D. C.
Western Plumbing Officials Association, Los Angeles, Calif.

FIRMS

Abingdon Potteries, Inc., Abingdon, Ill.
Adams, Franklin O., Tampa, Fla.
Ahern Co., John F., Fond du Lac, Wis.
Alert Pipe & Supply Co., Bay City, Mich.
Allen Co., Inc., Walter H., Dallas, Tex.
Altfillisch, Charles, Decorah, Iowa.
American Plumbers Supply Co., The, Toledo, Ohio.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa. and Sioux Falls, S. Dak.
Anchor Sanitary Co., Pittsburgh, Pa.
Andrews, Jones, Biscoe & Goodell, Boston, Mass.
Appleby Bros. & Whittaker Co., Harrisburg, Pa.
Asheim & Wilkins, Bridgeport, Conn. (General support.)
Bailey, Chas D., Montgomery, Ala.
Baker Plumbing Co., Beaumont, Tex.
Bardiche, I. A., Springfield, Vt.
Barthmaier, Eugene V., Philadelphia, Pa.
Baumer, Herbert, Columbus, Ohio.
Beeson, Carroll O., Crawfordsville, Ind.
Beith Co., New York, N. Y.
Bell Hardware & Plumbing, John D., Little Genesee, N. Y.
Bellman, Gillett & Richards, Toledo, Ohio.
Beshore & Co., Chas., Marion, Ind.
Bilz Plumbing & Heating Co., Spring Lake, Mich
Birdsall & Co., W. A., Linden, N. J.
Bishop, Horatio W., La Mesa, Calif.
Blackwell-Wielandy Co., St. Louis, Mo.
Blake-Rounds Supply Co., Portland, Maine.
Blosser, W. L., Moultov, Iowa.
Boehm, George A., New York, N. Y.
Bond Supply Co., Kalamazoo, Mich.
Borkenhagen, Herbert H., Milwaukee, Wis.
Bovard, William R., Kansas City, Mo. (General support.)
Bowles Co., Inc., Seattle, Wash.
Brainerd, Harry B., New York, N. Y. (General support.)
Braman, Dow & Co., Boston, Mass.
Brazer, Clarence W., New York, N. Y.
BRE Sanitary Seat Corp., Hyde Park, Mass.
Breedlove, C. L., Worthington, Minn.
Bridgeport Brass Co., Bridgeport, Conn. (General support.)
Briggs Manufacturing Co., Plumbing Ware Division, Detroit, Mich.
Brooks-Borg, Des Moines, Iowa.
Brown Co., P. J., Chicago, Ill.
Brown Wales Co., Boston, Mass.
Bruce-Rogers Co., Fort Smith, Ark.
Brust & Brust, Milwaukee, Wis. (General support.)
Bucky, Fred W., Jr., Jacksonville, Fla.
Buffalo, City of Architectural Service, Department of Public Works, Buffalo, N. Y.
Bullock Co., H. D., Toledo, Ohio.
Burlington Plumbing & Heating Co., Burlington, Iowa.
Camden Pottery (Division of Universal Sanitary Manufacturing Co.), Camden, N. J.
Canfield Supply Co., Kingston, N. Y.
Cannon & Mullen, Salt Lake City, Utah.
Careva Co., Inc., The, York, Pa.
Case & Son Manufacturing Co., W. A., Buffalo, N. Y.
Cedar Rapids Pump & Supply Co., Cedar Rapids, Iowa.
Central Plumbing Supply Co., The, Bridgeport, Conn.
Chandler Co., Cedar Rapids, Iowa.
Chapin, Rollin C., Minneapolis, Minn. (General support.)
Chicago Pottery Co., Chicago, Ill.
Cristman Co., The, Lansing, Mich.
Clark, Carl W., Cortland, N. Y.
Clark, Pendleton S., Lynchburg, Va.
Clow & Sons, James B., Chicago, Ill.
Cohen & Son, P., Brooklyn, N. Y.
Cole Supply Co., Tuscaloosa, Ala.
Cole Supply Co., Geo. H., Troy, N. Y. (General support.)
Connecticut Plumbing & Supply Co., Stamford, Conn.
Consolidated Plumbing & Heating Supply Co., Newark, N. J.
Consolidated Supply Co., Portland, Oreg.
Consolidation Coal Co. (Ky.), Jenkins, Ky.
Cornell University, Ithaca, N. Y. (General support.)
Coyne & Delany Co., Brooklyn, N. Y.
Cram & Ferguson, Boston, Mass.
Crane Co., Chicago, Ill.
Crowell & Lancaster, Bangor, Maine.
Daly & Sons, Inc., M. J., Waterbury, Conn.
Dalziel Plumbing Supplies, San Francisco, Calif.
Daniel, J. E., Jr., Malvern, Ark.
Darby, Bogner & Associates, W. Allis, Wis.
Davis & Warshow, Inc., New York, N. Y.
Detroit, City of, Department of Buildings & Safety Engineering, Detroit, Mich.
Detroit, City of, City Engineers Office, Detroit, Mich.
Detroit Sanitary Manufacturing Co., Detroit, Mich. (General support.)
Dick Brothers, Inc., Reading, Pa.
Dimach, H.—Plumbing & Heating, Rochester, Minn.
Dobbins, W. C. Trenton, N. J.
Douglas Co., The John, Cincinnati, Ohio.
Du-Kane Supply Co., Pittsburgh, Pa.

Dunning & Co., R. B., Bangor, Maine.
Eberhard, William, Brooklyn, N. Y.
Elizabeth Plumbing & Heating Supply Co., Elizabeth, N. J.
Eljer Co., Ford City, Pa.
Emery Industries, Inc., Cincinnati, Ohio.
Endicott Supply Co., Vineland, N. J.
Engineering Systems, Inc., Chicago, Ill.
English, Miller & Hockett, Hutchinson, Kans.
Evans, M. R., Lancaster, Pa.
Fall River Steam & Gas Pipe Co., Fall River, Mass.
Farrell, Gerald F., Plains, Pa.
Federal Huber Co., Chicago, Ill.
Fehn & Son, Sidney M., College Point, N. Y.
Fellheimer, Alfred, & Steward Wagner, Architects-Engineers, New York, N. Y.
Fick Bros., Reading, Pa.
Flannagan, Eric G., Henderson, N. C.
Fords Porcelain Works, Perth Amboy, N. J.
Frantz & Spence, Saginaw, Mich.
Frazer & Benner, El Paso, Tex.
Frontier Water & Steam Supply Co., Buffalo, N. Y.
Galloup Pipe & Supply Co., Battle Creek, Mich.
Garber, Frederick W., Cincinnati, Ohio.
Gardner, H. Sumner, Binghamton, N. Y.
Gefro Supply, Inc., W. New York, N. J.
General Plumbing Supply Corp., Brooklyn, N. Y.
Georgeson, F. T., Eureka, Calif.
Gibb, Office of Arthur N., Ithaca, N. Y.
Gibbons Supply Co., M. J., Middletown, Ohio, and Dayton, Ohio.
Gibson Schlemmer Co., The, Cincinnati, Ohio.
Glauber, Inc., New York, N. Y.
Glenn, R. S., Eastland, Tex.
Goff, P. B., Minatare, Nebr.
Grady, Frank S., Carbondale, Ill.
Green & Co., Raymond C., Jenkintown, Pa.
Hahn, Stanley W., Cleveland, Ohio.
Hajoca Corp., Philadelphia, Pa.
Hallstead, H. E., Hay Springs, Nebr.
Hansen Plumbing Co., Dallas, Tex.
Hanson & Gavin, Virginia, Minn.
Haralson & Mott, Ft. Smith, Ark.
Hardison R. E., Plumbing & Heating, Kiowa, Kans.
Hardware & Supply Co., The, Akron, Ohio.
Harris Pump & Supply Co., Pittsburgh, Pa.
Hartford Plumbing Supply, Inc., Hartford, Conn.
Hasness, C. D., Harrisburg, Pa.
Hausman, N. W., Glen Cove, N. Y.
Haxby & Bissel Architects—J. S. Belair, Associate, Minneapolis, Minn.
Heliensteller, Hirsch & Watson, St. Louis, Mo.
Heller, Inc., Edward, Mt. Kisco, N. Y.
Herlan Lumber Co., E., Divernon, Ill.
Hermitage Engineering Co., Nashville, Tenn.
Hess Co., Charles, New York, N. Y.
Hodgdon, Charles, San Gabriel, Calif.
Hoffmann Manufacturing Co., B., Milwaukee, Wis.
Holsman-Holsman & Klekamp, Chicago, Ill.
Holyoke Supply Co., Holyoke, Mass.
Hooper Plumbing Co., Dallas, Tex.
Hope, Frank L., Jr., San Diego, Calif.
Hornberger, L. F., Dwight, Ill.
Houkom, S. M., Fargo, N. Dak.
Hoy's Plumbing Supply Corp., Albany, N. Y.
Hubbard Co., The S. B., Jacksonville, Fla.
Hubert, Karl, Connersville, Ind.
Hughes Heating & Plumbing Co., Minneapolis, Minn.
Hughes Supply Co., The, Mansfield, Ohio
Hunt Associates, B. F. (General support.)
Hunter & Co., Alfred J., Muskegon, Mich.
Hunting Co., The, Rochester, N. Y.
Hutchings, E. T., Louisville, Ky.
"I-X-L" Pump & Manufacturing Co., Inc., The, Philadelphia, Pa.
Ideal Manufacturing & Supply Co., Oskaloosa, Iowa. (General support.)
Illinois, University of, Urbana, Ill. (General support.)
Imperial Brass Manufacturing Co., The, Chicago, Ill. (General support.)
Industrial Supply Co., Terre Haute, Ind.
Integrity Supply, Inc., New York, N. Y.
Interstate Hardware Co., Inc., Bristol, Tenn.
Ivey, Inc., Edwin J., Seattle, Wash.
James Hardware & Plumbing Co., W. T., Bisbee, Ariz.
Jardine Plumbing Co., The, Chillicothe, Ohio.
Jefferson Supply Co., Pine Bluff, Ark.
Johns Hopkins Hospital, The, Baltimore, Md.
Johnson Co., A. W., Texarkana, Tex.
Johnson Co., J. D., Pensacola, Fla.
Johnson Hardware Co., Clarksburg, W. Va.
Johnson & Wilk, Kalamazoo, Mich.
Kahn Associated Architects & Engineers, Inc., Albert, Detroit, Mich.
Kalispell Mercantile Co., Kalispell, Mont.
Kansas State College, Manhattan, Kans.
Keffer & Jones, Des Moines, Iowa.
Keich & O'Brien, Warren, Ohio.
Kelley, Frederic P., Millington, N. J.
Kilham, Hopkins & Greeley, Boston, Mass.
Kinsey Co., H. P., Easton, Pa.
Klink & Co., N. S., Phoenix, Ariz.
Knapp Supply Co., The, Muncie, Ind.
Kohler Co., Kohler, Wis.
Koller Bros. Co., The, Cleveland, Ohio.
Kurfiss, Selby H., Kansas City, Mo.
Kurtz Co., Mason City, Iowa.
Kurtz Co., L. H., Des Moines, Iowa.
Kyle, Herbert S., Charleston, W. Va. (General support).
La Crosse Plumbing Supply Co., La Crosse, Wis.
Lange, Robert, & James M. Everett, Allentown, Pa.
Lange Pipe & Supply Co., Pasadena, Calif.
Lansing Supply Co., Lansing, Mich.
Larkin & Co., Inc., J. K., Woodside, L. I., N. Y.
Law, Law, Potter & Nystrom, Madison, Wis.
Leavy, Harry H., Stanhope, N. J.
Lebanon Plumbing Supply Co., Lebanon, Pa.
Lee, Inc., Thomas J., Elizabeth, N. J.
Lee Co., Inc., George G., Norfolk, Va.
Lee & Hewitt, Paterson, N. J.
Lehigh Plumbing & Heating Co., Allentown, Pa.
Lehigh Valley Supply Co., Allentown, Pa.
Leimkuehler, F. Ray, St. Louis, Mo.
Levine, Ernest, New Brunswick, N. J.
Levy, Will, St. Louis, Mo.
Locke Stevens, Inc., Somerville, Mass.
Loeb, Laurence M., White Plains, N. Y.
Lorenz Co., Klamath Falls, Oreg.
Lovatt, George I., Philadelphia, Pa.
Lukomski Bros. Co., Detroit, Mich.
Madsen & Howell, Inc., Perth Amboy, N. J.
Malone, Robert E., Little Falls, N. Y.
Malone Plumbing Supply Co., S. S., Pittsburgh, Pa.
Mann & Co., Architess & Engineers, Hutchinson, Kans.
Mansfield Sanitary Pottery, Inc., Perrysville, Ohio.
Marshall Wells Co., Portland, Oreg.
Martin, Edgar, Chicago, Ill.
Mason & Co., George D., Detroit, Mich.
Massena & duPont, Wilmington, Del.
Master Plumber & Heating Contractor Mazagine, Brooklyn, N. Y.
Mauran, Russell, Crowell & Mullgardt, St. Louis, Mo.
May Supply Co., Anderson, Ind.
McArdle & Cooney, Inc., Philadelphia, Pa.
McArdle & Walsh, Inc., Baltimore, Md.
McAuliffe & Burke Co., Boston, Mass.
McClung & Co., C. M., Knoxville, Tenn.
McGowin Lyons Hardware & Supply Co., Mobile, Ala.
McNally Plumbing & Heating Supply Col, Milwaukee, Wis.
McNeill Plumbing & Heating Co., O. H., Herrin, Ill.
Mechanical Construction Corp., Hibbing, Minn.
Melching, Walter G., Newport, Ky.
Merrimack Valley Supply Co., Lowell, Mass.
Meyer, F. & J., New York, N. Y.
Midland Plumbing Supply Co., East St. Louis, Ill.
Milano, M. Joseph, Belmont, Mass.
Miller & Vrydagh, Terre Haute, Ind.
Mission Pipe & Supply Co., San Diego, Calif.
Missoula Mercantile Co., Missoula, Mont.
Missouri Water & Steam Supply Co., St. Joseph, Mo.
Modern Plumbing & Heating Co., Grand Rapids, Mich.
Monroe Co., Jamaica Plain, Mass.
Montgomery Hospital, Norristown, Pa.

Montgomery Ward, Chicago, Ill.
Mooser, William, San Francisco, Calif.
Moran Plumbing & Heating Co., Clifford, Highland Park, Ill.
Morley Bros., Saginaw, Mich.
Mueller, Hair & Hetterich, Hamilton, Ohio.
Muhlenberg Brothers, Reading, Pa.
Muhlenberg, Yerkes & Muhlenberg, Reading, Pa.
Mullins Manufacturing Corp., Warren, Ohio.
Murray Corporation of America, The Scranton, Pa.
National Plumbing Fixture Corp., Elwood City, Pa.
Nelson, Albert L., St. Louis, Mo.
Nelson Co., N. O., St. Louis, Mo.
New York State Department of Public Works, Division of Construction, Rensselaer, N. Y.
Northern Hardware & Supply Co., Menominee, Mich.
Northwest Plumbing Supply Co., Seattle, Wash.
Oakland Public Schools, Oakland, Calif.
O'Donnell Co., Val J., Worcester, Mass.
Officer, Gwynn, Lafayette, Calif.
O'Hair & Co., P. E., San Francisco, Calif.
Oklahoma, University of, School of Architecture, Norman, Okla.
Olsen & Heffernan, San Francisco, Calif.
Orange Memorial Hospital, Orange, N. J.
Orlowitz Co., Inc., Louis B., Philadelphia, Pa.
O'Rourke Plumbing & Heating Co., W. R., Walla Walla, Wash.
Orr, Palmer, Inslee & Huber, Los Angeles, Calif.
Osterfeld Co., The H. J., Dayton, Ohio.
Pacific Plumbing & Heating Supply Co., San Francisco, Calif.
Pacific Pottery Division, Universal Sanitary Manufacturing Co., Redlands, Calif.
Palmer Supply Co., Seattle, Wash.
Paterson General Hospital, Paterson, N. J.
Pattison Supply Co., The W. M., Cleveland, Ohio.
Peerless-Oklahoma Co., Oklahoma City, Okla.
Peerless Pottery, Inc., Evansville, Ind.
Peerless-Tulsa Co., Tulsa, Okla.
Peerless-Utah Co., Salt Lake City, Utah.
Pehrson & Associates, G. A., Spokane, Wash.
Pennsylvania, Commonwealth of, Bureau of Standards, Department of Property & Supplies, Harrisburg, Pa.
Pennsylvania Hospital, Philadelphia, Pa.
Pepper, Geo. W. Jr., Philadelphia, Pa.
Perkins, Harland A., Lynnfield Center, Mass.
Pfeiffer & Son, Fred R., Erlange, Ky.
Phelps & Dewees & Simmons, San Antonio, Tex.
Piers, Eber F., Ogden, Utah.
Pinski Bros., Inc., Great Falls, Mont.
Plimpton & Hills Corp., Hartford, Conn.
Plumbers & Factory Supplies, Inc., Columbus, Ohio.
Plumbers' Supply Co., New Bedford, Mass.
Plumbers Supply Co. of St. Louis, St. Louis, Mo.
Plumbing & Heating Supply Co., Inc., The, Nashville, Tenn.
Poekert, R. A., Pittsburgh, Pa.
Providence Pipe & Sprinkler Co., Providence, R. I.
Raffel Supply Co., Chicago, Ill.
Rainear & Co., Inc., C. J., Philadelphia, Pa.
Rains, Raymond, Louisville, Ky.
Ral Supply Co., Passaic, N. J.
Ramage, H. L., d/b/a H. L. Ramage, C. E., York, Pa.
Rapid Plumbing Co., Rapid City, S. Dak.
Rayl Co., The, Detroit, Mich.
Reading Foundry & Supply Co., Reading, Pa., and other cities.
Reddington Supply Co., Scranton, Pa.
Redmond Co., The Geo., Cleveland, Ohio.
Reeves-Wiedeman Co., Kansas City, Mo.
Reid, William H., Jr., Billings, Mont.
Rexall Drug Co., Los Angeles, Calif.
Rhode Island Supply & Engineering Co., Providence, R. I.
Riber, George L., Detroit, Mich.
Richmond Radiator Co., New York, N. Y.
Richmond Sanitary Co., (Division of Pacific Can Co.), San Francisco, Calif.
Ries, A. G., Munhall, Pa.
Riggs, Lutah Maria, Arvin B. Shaw, Santa Barbara, Calif.
Ringle, David, Midvale, N. J.
Ritchie & Associates, James H., Boston, Mass.
Robbins-Gamwell Corp., Pittsfield, Mass.
Robert & Co., Inc., Atlanta, Ga.
Roberts-Hamilton Co., Minneapolis, Minn.
Robertshaw, Milton M., W. Orange, N. J.
Robischung-Kiesling Contracting Corp., Houston, Tex.
Rodgers Supply Co., McKees Rocks, Pa.
Roekel Co., The, Zanesville, Ohio.
Rogers Ebert Co., The, Orange, N. J.
Rom Co., The Robert, Milwaukee, Wis.
Royal Brass Manufacturing Co., The, Cleveland, Ohio. (General support.)
Rubly, William, Indianapolis, Ind.
Ruffing, Frank J., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Sanitary Engineers Supply Co., The, Cleveland, Ohio.
Sanitary Plumbing Co. (George Von Tungeln), Redlands, Calif.
Schmidt, Garden & Erikson, Chicago, Ill.
Scofield, W. F., Springdale, Conn.
Scott Co., The Charles B., Scranton, Pa.
Seamans, H. W., E. Pembroke, N. Y.
Seashore Supply Co., Atlantic City, N. J.
Sears, Roebuck & Co., Chicago, Ill.
Shepley-Hayner Corp., Freeport, Ill.
Sherwood Brass Works, Detroit, Mich.
Shields Plumbing Co., San Rafael, Calif.
Silk City Plumbing Supply Co., Paterson, N. J.
Simpson, Inc., W. H., Olean, N. Y.
Slauter, R. L., Jacksonville, Fla.
Sleeper, Harold R., New York, N. Y.
Sloan Valve Co., Chicago, Ill.
Smolka Co., Inc., New York, N. Y.
Somerville Co., Thos., Washington, D. C.
South Plumbing Supply Co., Inc., Jamaica, N. Y.
Southern States Supply Co., Columbia, S. C.
Splangler Plumbing Co., Birmingham, Ala.
Speakman Co., Wilmington, Del.
Spear, Harry B., Irwin, Pa.
Specification Record, Chicago, Ill.
Standard Supply Co., Portsmouth, Ohio.
Staten Island Supply Co., Inc., Staten Island, N. Y.
Staub & Rather, Houston, Tex.
Stoetzel, Ralph, Chicago, Ill.
Stokes & Allyn, Portland, Oreg.
Streeter, D. D., Brooklyn, N. Y.
Stroh & Wilson, Inc., New York, N. Y.
Sullivan Hardware Co., Anderson, S. C.
Sweet's Catalog Service, New York, N. Y. (General support.)
Taggart Plumbing Co., New York, N. Y.
Tallman Co., University City, Mo.
Tay-Holbrook, Inc., San Francisco, Calif.
Taylor, Ellis Wing, Los Angeles, Calif.
Taylor Plumbing & Heating, Grand Rapids, Minn.
Temple, Arthur, Davenport, Iowa.
Tennessee Mill & Mine Supply Co., Knoxville, Tenn.
Texas Technological College, Lubbock, Tex. (General support.)
Thill Supply Co., Inc., Brooklyn, N.Y.
Thompson-Durkee Co., Boston, Mass.
Thorne, Henry Calder, Ithaca, N. Y.
Thornley Supply Co., The, Pawtucket, R. I.
Thorn's, Inc., Clearfield, Pa.
Topeka Steam Boiler Works Co., Inc., Topeka, Kans.
Townsend & Gehron, Martinsville, Ohio.
Trant & Bro., Inc., Thomas, Hartford, Conn.
Trenton Potteries Co., The, Trenton, N. J.
Trimble & Lutz Supply Co., Wheeling, W. Va.
Trumbull Plumbing Supply Co., Inc., Warren, Ohio.
Turner & Van Scoy Co., Inc., Wilkes-Barre, Pa.
United States Testing Co., Inc., Hoboken, N. J. (General support.)
Universal Sanitary Manufacturing Co., New Castle, Pa.
Valley Plumbing & Heating Supply Co., Menasha, Wis.
Van Camp Hardware & Iron Co., Indianapolis, Ind.
Van Denberg Supply Co., Rockford, Ill.
Van Os & Flaxman, Shreveport, La.

Virginia Polytechnic Institute, Blacksburg, Va. (General support.)
Voell Co., Washington, D. C.
Vogel & Son Co., P. A., Louisville, Ky.
Warburton's, Madera, Calif.
Warren Balderston Co., Trenton, N. J.
Webb Manufacturing Co., F. W., Boston, Mass.
Weber & Co., Inc., C. L., Philadelphia, Pa.
Weekes & Son Co., John, Watertown, N. Y.
Weeks Co., Ralph E., Scranton, Pa.
Welch, Carroll E., Huntington, N. Y.
Welker Supply Co., The, Cleveland, Ohio.
West, Albert E., Boston, Mass.
Western Metal Supply Co., San Diego, Calif.
White & Shauger, Inc., Paterson, N. J.
Whiting-Mead Pottery Co., La Crescenta, Calif.
Whitney & Ford Co., Chicago, Ill.
Wight & Wight, Kansas City, Mo.
Willatsen, Andrew, Seattle, Wash.
Willson, Fred F., Bozeman, Mont.
Wilson, Glenn C., San Antonio, Tex.
Wisconsin River Supply Co., Wausau, Wis.
Withey, Henry F., Sherman Oakes, Calif.
Wolf, Louis G., Henderson, Ky. (General support.)
Wolverine Brass Works, Grand Rapids, Mich.
Wood & Son, E. J., Clarksburg, W. Va.
Woolcock Plumbing & Heating Co., Niagara Falls, N. Y.
Worthen Co., A. B., Methuen, Mass.
Worthington Co., The George, Cleveland, Ohio.
Wright & Wright, Detroit, Mich. (General support.)
Young & Richardson, Seattle, Wash.
Zimmerman, A. C., Los Angeles, Calif.
Zimmerman Plumbing Supply Co., Inc., Staten Island, N. Y.

UNITED STATES GOVERNMENT

Agriculture, U. S. Department of, Washington, D. C.
Federal Housing Administration, St. Louis, Mo.
Interior, U. S. Department of the, Office of Indian Affairs, Chicago, Ill.
Justice, U. S. Department of, Construction Division, Bureau of Prisons, Washington, D. C.
National Housing Agency, Office of the Administrator, Washington, D. C. (General support.)
War Department, Washington, D. C.

COMMERCIAL STANDARDS

CS No. Item

0–40. Commercial standards and their value to business (third edition).
1–42. Clinical thermometers (third edition).
2–30. Mopsticks.
3–40. Stoddard solvent (third edition).
4–29. Staple porcelain (all clay) plumbing fixtures.
5–46. Pipe nipples; brass, copper, steel, and wrought-iron (second edition).
6–31. Wrought-iron pipe nipples (second edition). Superseded by CS5–46.
7–29. Standard weight malleable iron or steel screwed unions.
8–41. Gage blanks (third edition).
9–33. Builders' template hardware (second edition).
10–29. Brass pipe nipples. Superseded by CS5–46.
11–41. Moisture regains of cotton yarns (second edition).
12–40. Fuel oils (fifth edition).
13–44. Dress patterns (fourth edition).
14–43. Boys' button-on waists, shirts, junior and sport shirts (made from woven fabrics) (third edition).
15–46. Men's pajama sizes (made from woven fabrics) (third edition).
16–29. Wall paper.
17–47. Diamond core drill fittings (fourth edition).
18–29. Hickory golf shafts.
19–32. Foundry patterns of wood (second edition).
20–47. Staple vitreous china plumbing fixtures (fourth edition).
21–39. Interchangeable ground-glass joints, stopcocks, and stoppers (fourth edition).
22–40. Builders' hardware (nontemplate) (second edition).
23–30. Feldspar.
24–43. Screw threads and tap-drill sizes.
25–30. Special screw threads. Superseded by CS24–43.
26–30. Aromatic red cedar closet lining.
27–36. Mirrors (second edition).
28–46. Cotton fabric tents, tarpaulins and covers (second edition).
29–31. Staple seats for water-closet bowls.
30–31. Colors for sanitary ware.
31–38. Wood shingles (fourth edition).
32–31. Cotton cloth for rubber and pyroxylin coating.
33–43. Knit underwear (exclusive of rayon) (second edition).
34–31. Bag, case, and strap leather.
35–47. Hardwood plywood (third edition).
36–33. Fourdrinier wire cloth (second edition).
37–31. Steel bone plates and screws.
38–32. Hospital rubber sheeting.
39–37. Wool and part wool blankets (second edition). (Withdrawn as commercial standard, July 14, 1941).
40–32. Surgeons' rubber gloves.
41–32. Surgeons' latex gloves.
42–43. Structural fiber insulating board (third edition).
43–32. Grading of sulphonated oils.
44–32. Apple wraps.
45–45. Douglas fir plywood (sixth edition).
46–40. Hosiery lengths and sizes (third edition).
47–34. Marking of gold-filled and rolled-gold-plate articles other than watchcases.
48–40. Domestic burners for Pennsylvania anthracite (underfeed type) (second edition).
49–34. Chip board, laminated chip board, and miscellaneous boards for bookbinding purposes.
50–34. Binders board for bookbinding and other purposes.
51–35. Marking articles made of silver in combination with gold.
52–35. Mohair pile fabrics (100-percent mohair plain velvet, 100-percent mohair plain frieze, and 50-percent mohair plain frieze).
53–35. Colors and finishes for cast stone.
54–35. Mattresses for hospitals.
55–35. Mattresses for institutions.
56–41. Oak flooring (second edition).
57–40. Book cloths, buckrams, and impregnated fabrics for bookbinding purposes except library bindings (second edition).
58–36. Woven elastic fabrics for use in overalls (overall elastic webbing).
59–44. Textiles—testing and reporting (fourth edition).
60–36. Hardwood dimension lumber.
61–37. Wood-slat venetian blinds.
62–38. Colors for kitchen accessories.
63–38. Colors for bathroom accessories.
64–37. Walnut veneers.
65–43. Methods of analysis and of reporting fiber composition of textile products (second edition).
66–38. Marking of articles made wholly or in part of platinum.
67–38. Marking articles made of karat gold.
68–38. Liquid hypochlorite disinfectant, deodorant, and germicide.
69–38. Pine oil disinfectant.
70–41. Phenolic disinfectant (emulsifying type). (second edition) (published with CS71–41).
71–41. Phenolic disinfectant (soluble type) (second edition) (published with CS70–41).
72–38. Household insecticide (liquid spray type).
73–45. Old growth Douglas fir standard stock doors (third edition).
74–39. Solid hardwood wall paneling.
75–42. Automatic mechanical draft oil burners designed for domestic installations (second edition).
76–39. Hardwood interior trim and molding.
77–40. Sanitary cast-iron enameled ware.
78–40. Ground-and-polished lenses for sun glasses (second edition) (published with CS79–40).
79–40. Blown, drawn, and dropped lenses for sun glasses (second edition) (published with CS78–40).
80–41. Electric direction signal systems other than semaphore type for commercial and other vehicles subject to special motor vehicle laws (after market).
81–41. Adverse-weather lamps for vehicles (after market).
82–41. Inner-controlled spotlamps for vehicles (after market).
83–41. Clearance, marker, and identification lamps for vehicles (after market).
84–41. Electric tail lamps for vehicles (after market).
85–41. Electric license-plate lamps for vehicles (after market).
86–41. Electric stop lamps for vehicles (after market).
87–41. Red electric warning lanterns.
88–41. Liquid-burning flares.
89–40. Hardwood stair treads and risers.
90– . (Reserved for power shovels and cranes).
91–41. Factory-fitted Douglas fir entrance doors.
92–41. Cedar, cypress and redwood tank stock lumber.
93–41. Portable electric drills (exclusive of high frequency).

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94–41. Calking lead.
95–41. Lead pipe.
96–41. Lead traps and bends.
97–42. Electric supplementary driving and passing lamps for vehicles (after market).
98–42. Artists' oil paints.
99–42. Gas floor furnaces—gravity circulating type.
100–47. Porcelain-enameled steel utensils (third edition).
101–43. Flue-connected oil-burning space heaters equipped with vaporizing pot-type burners.
102– (Reserved for Diesel and fuel-oil engines.)
103–42. Cotton and rayon velour (jacquard and plain).
104–46. Warm-air furnaces equipped with vaporizing pot-type oil burners (second edition).
105–43. Mineral wool; loose, granulated, or felted form, in low-temperature installations.
106–44. Boys' pajama sizes (woven fabrics) (second edition).
107–45. Commercial electric-refrigeration condensing units (second edition).
108–43. Treading automobile and truck tires.
109–44. Solid-fuel-burning forced-air furnaces.
110–43. Tire repairs—vulcanized (passenger, truck, and bus tires).
111–43. Earthenware (vitreous-glazed) plumbing fixtures.
112–43. Homogeneous fiber wallboard.
113–44. Oil-burning floor furnaces equipped with vaporizing pot-type burners.
114–43. Hospital sheeting for mattress protection.
115–44. Porcelain-enameled tanks for domestic use.

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116–44. Bituminized-fibre drain and sewer pipe.
117–44. Mineral wool; blankets, blocks, insulating cement, and pipe insulation for heated industrial equipment.
118–44. Marking of jewelry and novelties of silver.
(E)119–45. Dial indicators (for linear measurements).[1]
120–46. Standard stock ponderosa pine doors (second edition).
121–45. Women's slip sizes (woven fabrics).
122–45. Western hemlock plywood.
123–45. Grading of diamond powder.
(E)124–45. Master disks.[1]
125–45. Prefabricated homes.
126–45. Tank mounted air compressors.
127–45. Self-contained mechanically refrigerated drinking water coolers.
128–45. Men's sport shirt sizes—woven fabrics (other than those marked with regular neckband sizes).
129–46. Materials for safety wearing apparel.
130–46. Color materials for art education in schools.
131–46. Industrial mineral wool products, all types—testing and reporting.
132–46. Hardware cloth.
133–46. Woven wire netting.
134–46. Cast aluminum cooking utensils (metal composition).
135–46. Men's shirt sizes (exclusive of work shirts).
136–46. Blankets for hospitals (wool, and wool and cotton).
137–46. Size measurements for men's and boys' shorts (woven fabrics).
138–47. Insect wire screening.
139–47. Work gloves.
140–47. Convectors: testing and rating.
141–47. Sine bars, blocks, plates, and fixtures.

[1] Where "(E)" precedes the CS number, it indicates an emergency commercial standard, drafted under war conditions with a view toward early revision.

NOTICE.—Those interested in commercial standards with a view toward accepting them as a basis of everyday practice may secure copies of the above standards, while the supply lasts, by addressing the Division of Trade Standards, National Bureau of Standards, Washington 25, D. C.

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